Status Report on

European Telework

New Methods of Work 1999

Foreword

More then 9 million Europeans now telework on the threshold of the 3rd Millennium. This everyday use of new technologies at work goes hand in hand with the recognition that for many organisations human resources have become their greatest asset. The need to enhance the flexibility of the organisation and the individual by bringing work to people rather than people to work goes hand in hand with the individual's concern to improve the quality of life.

The pace of change is now extraordinary. The widely available evidence of the high speed of uptake of, for instance, GSM phones and Internet, both facilitators of telework, is now supported by the results of a European-wide survey of more then 7,000 households and more then 4,000 business decision makers in 10 Member States.[1] This confirms the forecast of the High Level Group under the chairmanship of former Commissioner Bangemann responsible for the report "Europe towards the Information Society" in 1995.

Whereas change in working practices was initially slow, innovations and improvements in supporting technologies and deregulation of telecommunications have now created circumstances that make it possible for many people to work in new ways. The exponential growth of telework in Europe is reflected in and supported by the mainstreaming of support for adaptation to an Information Society in European Research and Structural Funds.

This publication includes updated information on the latest developments and initiatives, in European Research Programmes, Structural Funds and the support measures for Trans European Networks. It also contains the highlights of the European benchmarking survey, illustrated by country overviews of main issues in telework uptake. You can find reports from previous years, as well as the latest version of the most recent report, on http://www.eto.org.uk.

Telework is not an objective in itself, but an indicator of changes in all aspects of working life and a convenient focus for understanding them. Business and social dialogue is now focusing on the issues raised by telework, and this will continue to be stimulated by the European Commission. The annual European Assemblies on "New Ways to Work"[2], and European Telework Week[3] will provide important opportunities for debate and for widening the general awareness of new possibilities.

Telework is gradually becoming a normal way of working for most Europeans at some stage in their working life. Your active contribution to research, debate and actual uptake, at whatever level, is important to maximising the opportunities for sustainable improvement to European competitiveness and the quality of our working lives.

The views expressed in this document are those of the numerous contributing authors, not necessarily of the Commission itself.

Peter Johnston   Maarten Botterman

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[1] ECaTT project, see section 3.1.1

[2] 6th European Assembly *Making telework work for all*, 22 –24 September 1999, Aarhus (DK) and 7th European Assembly *Working in the 3rd Millennium*, September 2000, London (UK)

[3] European Telework Week: *Work in the Information Society*, 1st week of November, http://www.etw.org

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1   Introduction

1.1   The mainstreaming of telework

Telework continues to very rapidly develop as a normal way of working in Europe. By becoming a mainstream practice, it is now even more urgent for European governments, enterprises and individuals to recognise and respond to the impact that freedom from the constraints of time and place on work and a change in working culture is having on our economy and society, as well as on working and private lives. It is important that we make every effort to better understand where these developments are taking us, and where we wish ourselves to go, in order to exploit the new opportunities for ensuring greater competitiveness at the same time as we improve the quality of working lives.

Telework was, ten years ago, a peculiar way of working engaged in only by a technological elite, but this has since been transformed into a practice which has become an accepted way of working widely practised in at least some Member States and some important economic sectors. Today, in 1999, there are over 9 million Europeans engaged in new working practices directly involving the use of networked technologies, even though this is unevenly distributed across the Member States, with high levels of adoption in some countries contrasted with very low levels in others. Moreover, and given the increasing speed of work innovation resulting from the use of new technologies, this level is almost certainly only the tip of the iceberg in terms of developments we can expect over the next few years. This will lead to the most substantial change in working practice in Europe for a very long time which will come to affect almost everybody in Europe at some stage in their working lives over the next five to ten years.

The reason for such interest in these new methods of work is not a fascination with the technologies themselves, but rather a common desire to maximise their beneficial impact on Europe's competitiveness, productivity and working conditions. There is still some concern in many quarters about what is perceived as the remaining high level of unemployment in Europe in general, as well as in some major countries. The picture is, however, far from being only negative, as the worst of the unemployment problems seem now to be past and the levels are now beginning to decline. This is largely a result of substantial new job creation associated with the development of the Information Society and the emergence of very strong job growth in the service sector.

There is also evidence that, after about 2007, the difference between incoming and outgoing flows to Europe's working age population will start to become negative and this population will thereafter increasingly shrink in both absolute and relative terms, leaving Europe with a longer term problem of labour shortage, at least in certain key sectors and skills[4]. Information Society developments, particularly in their relation to employment and new ways of working in, for example service provision, are going to be at least part of the solution to remaining unemployment problems, as well as helping to address such challenges.

1.2   Telework, work and the economy

There is now little doubt that new technologies in general, and ICTs in particular, are having a deep-seated and largely beneficial effect on economic productivity, competitiveness and overall business performance. For many years there has been a debate about the so-called *productivity paradox:* has the introduction of information technology into a business actually improved productivity, as was the intention? It is now realised

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[4] *Employment and employability in 2010 Europe*, by Ken Ducatel and James P Gavigan, Institute of Prospective Technological Studies, Seville, Spain, part of the European Commission's Joint Research Centre's *Futures* Programme, July 1999.

that there is always a lag between the introduction of such technology and its full exploitation, which requires changing the way things are done and the way the business is organised and managed, taking into account how the market develops. We now know that if these changes are made successfully, productivity and overall business performance can improve significantly.

For example, when comparing two cohorts of companies, one implementing ICTs, upgrading skills and changing the management structure and one doing none of these things, over a period of 6-8 years, the former cohort achieved a significantly higher long-term productivity growth compared to the latter. Interestingly, this was after initial lower productivity growth due to the need for individuals to learn how to use the technology (data from Eurostat show that acquiring ICT skills can be a costly and time-consuming process) as well as change the management structure.[5]

Similarly, evidence from a recent review of the effects of the Technologies for Business Processes (TBP) domain of the European Commission's ESPRIT Programme clearly shows that TBP projects had a real impact on a company's business performance[6]. Many respondents (55%) indicated an improvement in their overall competitiveness, and many expected an increase in turnover (47%), in customer base (49%) and market share (34%).

The ICT industry, and particularly the Internet and electronic commerce, is starting to change every corner of our economies. The latest data[7] show that the Internet is slashing costs between suppliers and customers, and as it creates new businesses and realigns old ones, it is scrambling notions of economic value. The impact of the Internet is hard to quantify because of its rate of growth, as for instance every second seven new people worldwide log in for the first time, but the glimmerings of a new economy are becoming visible.

Researchers at the University of Texas estimate that the Internet generated US$301 billion just in the USA in 1998. Business-to-business e-commerce alone is likely to swell almost thirty-fold from US$48 billion last year to US$1.3 trillion in 2003, according to the technology consulting firm Forrester Research Inc. It estimates that consumers spent US$8 billion on computers, books, CDs, clothing and other items on the Internet last year. Eighty million Americans are now online according to the US Commerce Department, and in 3¼ years this number will grow by about 60% to 130 million, one half of the US population.

In the airline business, the use of the Internet is wiping out the need for travel agent intermediaries to sell and process tickets by reducing these costs by 85%. One of the new companies in this area is TISS.COM, a German firm, based on the Internet. Having started in 1995, the founder reported over 700,000 registered users in 1998. 20,000 visitors a day are buying about 200 tickets from this two-people company. 60% of their customers are Americans, 25% Europeans, the others from all over the world. Two features that distinguish this service from the more traditional travel agencies are: Air Tracker and Fare Tracker. The latter compares the prices and offers the cheapest fare first.

AIRtracker
the flightpager

AIRTRACKER ST
#LH235 30Nov
FRA OFF 12:11
JFK ETA 18:50

Sleep longer …
…play more golf …
see more clients ...

FAREtracker
the farefinder

WHERE ?

WHEN ?

MAX.PRICE '

NOTIFICATION:
via *Email*
and/or
Mobile Phone

WWW.TISS.COM

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[5] Reported in the European Social Fund, *Info Review*, No. 7, February 1999, page 4, published by the European Commission, and based on original OECD data.

[6] *Mid-term evaluation results of 135 European companies transforming their business: project results from the Technologies for Business Processes Domain of the ESPRIT Programme*, published by DGXIII of the European Commission, February 1999

[7] These data and research findings are reported in *The Washington Post*, July 1999.

The Internet can do more than lower costs; it can also raise revenues, for example in allowing airlines to fill seats at the last minute, which would otherwise remain empty, by making information about them instantly available to potential travellers. This often enables TISS, for instance, to offer fares with a 70% reduction.

The Internet is increasing business profitability in other ways as well, for instance by changing the way airline maintenance work is carried out through making up-to-date procedures and specifications instantly available worldwide rather than mailing or faxing printed manuals which rapidly become obsolete.

All of these developments and transformations are, of course, profoundly changing work and employment; indeed they are delineating the new forms of telework which are now starting to emerge. A recent and topical example, and almost certainly a signpost to the future, is the way the Linux computer operating system has started to emerge as at least one alternative to the dominance of Microsoft and Apple. Indeed, Linux could not have become a serious and valued product without the Internet itself and the new method of working it has enabled. By bringing together widely dispersed and expert individuals to work on the original Linux kernel placed on the Internet by a Finn, Linus Torvalds in 1991, and by freely sharing their work, this loose informal group has, without any management or overall coordination, turned Linux into one of the best versions of UNIX ever created.

What the Linux story really shows us is the power of an electronic network to fundamentally change the way work is done. The Linux community, a temporary, self-managed virtual gathering of diverse individuals engaged in a common task, is a model for a new kind of business organisation that could form the basis for a new kind of economy[8].

1.3   Telework in flux

As the above has shown, we are now moving into a period of dramatic change in the workplace for almost everybody in Europe, whether in a traditional office environment or in new work situations. Everybody will need to learn to work differently in the future, utilising different technologies, organising themselves in new ways, and undertaking new tasks in new markets, and this will be very challenging to the vast majority of people.

As one of the main planks of these changes and challenges, European telework in 1999 is continuing to evolve and is now going through a stage which sees the rapid growth of different, contrasting and dissipating forms. To understand this, it may be useful to see the evolution of telework as progressing through four ages (see box).

In 1999, telework as a concept and in practice is now fusing with, and metamorphosing into, a whole range of other developments and innovations, such as electronic commerce, knowledge management, the globalisation of trade and markets, virtual and learning organisations and teams, intellectual capital development, skills and competence development, organisational teaming, smart organisations, the digital or network economy, de-materialised or intangible production, etc., etc.

It is starting to be difficult, now, to separate telework from these other developments, and indeed it becomes increasingly irrelevant to do so, except in the sense that telework, as work based upon or enabled by network technologies, represents the new work perspective of the burgeoning Information Society.

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[8] See *The dawn of the e-lance economy*, by Thomas Malone and Robert Laubacher of MIT's Sloan school of Management, Cambridge, Mass., USA, in the "Harvard Business Review", September-October 1998.

Thus telework today has many names and appears in many guises, such as new ways and methods of working; *work nouveau;* working across the networks; net-working; virtual working; digital teaming, etc. Teleworking is catalysing change in all work and, as such has wide spill-over and dissipation effects. Four examples are given below.

The First Age: <u>telework is *out in the cold*</u>

The 1980s: European teleworkers measured in thousands rising to 1 million by late 1980s

Telework was a topic for discussion amongst some researchers and policy makers and practised only by a handful of gurus and by the technological elite

The Second Age: <u>telework is *in the kitchen*</u>

Early to mid 1990s: 1 to 2 million European teleworkers

In this age, vanguard economic groups took over, especially those individuals with the resources and authority to be able to determine their own ways of working without recourse to higher decision-makers

The Third Age: <u>telework is *by the fire*</u>

1997-98: between 2 and 4.5 million European teleworkers (though this is probably an under-estimate)

This age marked the take-off of telework during which a meeting of minds and objectives started to form between large numbers of decision-makers (who began to see the economic benefits of teleworking), and large numbers of workers (who began to understand and demand the benefits telework could bring to both their working and private lives)

The Fourth Age: <u>telework is *in the frying pan*</u>

From 1999: over 9 million European teleworkers

Telework is now in flux; it is starting to exhibit a wide range of characteristics and forms, entering a large number of different sectors and situations, and using manifold techniques and methods, all of which, however, arise from the core characteristic of being enabled by the new network technologies. In this context, telework is indeed becoming the new form of work.

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1) *Who* you work with

Work is attaching itself to people not the place. With the new technologies, who you know in your network, and your relationships to them, are becoming much more important in determining modes of working than where you or they happen to be located. It is people, not places, that now define an organisation, and this is becoming a shifting, semi-permanent, group of people determined by the changing needs of the task in hand and the market. All this is helping to re-emphasise the key role of personal relationships and the fact that these are becoming more complex and interchangeable, so that any individual can frequently change roles between doing work, managing work, selling work, buying work, etc. Trust and confidence have become the only real glue by which these dynamic relations can hold together and prosper.

For example, a 1998 Siemens-Nixdorf telework study in Stockholm showed that teleworkers, as opposed to traditional office workers, placed great emphasis on cohesion with their colleagues, interesting work and visible (not necessarily physically visible) management. The traditional workers, on the other hand, did not espouse these aspects as much and showed much more interest in physical work spaces and retaining office hierarchies[9].

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[9] Reported in the Danish edition of "Computer World", 20 October 1998, page 22.

Another 1998 study, undertaken by Gallup over many years and countries, pointed directly to the prime importance of small groups and teams, rather than overall corporate culture, in galvanising success. Good relationships between team members and with the team leader/manager, even when these are not physically established and maintained, can it seems outweigh all other factors in increasing productivity and creativity[10].

Many see the fundamental unit of the future network economy as the individual rather than the corporation. Tasks will no longer be assigned and controlled through a stable chain of management but will instead be carried out autonomously by independent contractors. These electronically connected freelancers – *e-lancers* – join together into fluid and temporary networks to produce and sell goods and services. When the task is complete, the network dissolves, and its members become independent agents again, circulating through the economy seeking the next assignment. This is also happening within large organisations where we see the increasing importance of ad-hoc project teams, the rise of *intrapreneurs*, and the formation of independent business units[11].

2) New work forms

The new technologies are fostering new kinds of organisation and new ways of organising work. Virtual teams and organisations, often as temporary phenomena to undertake a particular task, are being created, transformed and then abandoned as soon as the need for them has passed. Some particularly interesting examples include the *free agent* movement, which arose in North America but is increasingly also being taken up in Europe. This builds directly upon the more traditional free-lance, independent worker experience but is now able to extend this over a much wider geographical range and a greater number of interlocking markets because of new networking capabilities.

The new *free agents* have total flexibility in, and often total control over, how, where and when they work, and are very much the "stars" of the labour force who can pick and choose work from a great number of potential clients. Possessing unique or highly sought after skills, *free agents* are individuals who shun traditional corporate career paths and the worker-boss relationship, substituting instead the *hard fun* of activities they wish to engage in and thus into which they are prepared to invest a lot of effort and expect to retain much of the benefit.

Developments like this critically challenge traditional labour market regulations and collective bargaining processes and clearly need to be incorporated in the future into looser and more flexible arrangements which still attempt to provide security, albeit often in new forms, for the individual. Indeed, *free agents* claim to achieve much greater personal security by having a large number of clients or partners, instead of relying on just one (employer), which, if lost, means everything is lost.

Another significant movement is the rise of the so-called *fast company*, which balances between the extremes represented by *free agents* and the traditional career path. As the name implies, a *fast company*, tends to be rapidly constructed and rapidly transformed or dismantled as need or wishes direct, but it still provides a greater sense of belonging and continuity than *free agency*. Again, trust and loyalty are not taken for granted but positively nurtured and developed.

Fast companies provide a stable, if temporary, organisation where mutual commitment can build relationships and social glue, in which finding good people to work with and for, without the traditional "them" and "us" of employer-employee relationships, becomes the biggest challenge. It is in such companies that using *inter alia*

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[10] Reported in "The Economist", 8 August 1998, page 60.

[11] See *The dawn of the e-lance economy* op cit.

the new technologies permits "getting closer to your employees (colleagues)" just as much as it enables "getting closer to your customers"[12].

Both these examples, growing though not yet widespread, reveal a critical change in the relationship between work and organisational form. In the past organisational forms, more or less fixed and taken from wider society so that they were typically based upon hierarchy, seniority and paper qualifications alone, have been adopted to organise and manage work; *the organisation has determined the task*. The new network technologies are now providing a key tool to reverse this relationship. *The nature of the task and the needs of those involved can now determine the organisational form adopted.*

Organisational form is thus no longer fixed or given as it becomes simply one of the tools used to carry out the task in hand. Clearly, the manifold characteristics of tasks and interests is showing itself in a bewildering variety of organisational forms. This constitutes a challenge as much as a marvellous opportunity. How can Europe's policies, institutions and frameworks give free rein to beneficial forms of work whilst also providing opportunities (perhaps even protecting) those who may never become "stars" whether through desire or ability?

3) Transforming workplaces

As with work forms, so too a large number of new and innovative working environments are mushrooming in the fertile soil being created around the new technologies. The diversity is so great that many of them are building opposing trends, for example, workplaces are becoming both more and less personalised. As work and private life coalesce, we can see many examples of the personalisation of space.

In some cases, such as many of the enterprises in Silicon Valley, California, workers are taking over and claiming for their own the "office". Because they spend so much time there at any time of the day or night, offices are becoming more like home with personal belongings and furniture, even beds, and TVs being introduced.

Similarly, many of the new tele-homeworkers are making part of the home into a personal office environment, more or less shut off from the rest of the home space, but nevertheless unavoidable affected by ordinary home and family activities.

At the other extreme, there are many cases of de-personalised work spaces, for example *hot-desking* which tends to tear down the walls of the traditional office, in which people had their own personal and permanent space, to substitute group space where individuals book or find space as they need it. In companies like Oticon in Copenhagen or Andersen Consulting in Paris, rigid compartments are disappearing as many employees store their few personal possessions on a trolley, moved around at will, and plug their lap-tap into the most convenient socket, depending upon whether they require quiet surroundings or whether they wish to work with a group of colleagues.

These examples are linked to other new workplace concepts, largely enabled by the technology, although of course with other factors, such as specific strategic and human resource policies, also important. Many large corporations are starting to rethink office and workplace strategies and environments, often in association with a move out of prime sites in city central business districts.

For example, the new British Airways London headquarters has moved away from Heathrow, where space is at a premium, and created a working new environment, not designed to impress from the outside, as was traditionally the case, but to impress the workers within. This is done by maximising internal contact between

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[12] Both the *free agent* and *fast company* movements have been described by, for example, Daniel Pink and the *Fast Company Magazine*.

all levels of workers and management, mixing personalised and de-personalised space, designing facilities and functions around internal village streets, cafés, restaurants, shops and training areas, creating "touch-down" areas for employees arriving back after travel, team areas and quiet zones. An overriding aim has been to create attractive places to linger and mix, to foster serendipitous meetings and to get people's paths to cross, all in the name of creating a new culture and increasing flexibility and innovation.

All is, of course, held together by the technology, not just lap-tops and LANs but also digital cordless phones. These examples illustrate the way the new work forms, based on the new technology, are enabling people to be mobile and flexible within the workspace as well as outside it[13].

4) The blurring of work, life and learning

One of the key trends in the Information Society is the breaking down of barriers between people, places, roles and activities in which the new technologies play a critical part. Again, this presents both opportunities and threats; opportunities for creativity and new forms of expression, wealth and welfare; threats because of the sweeping away of old secure certainties and the corresponding difficulty of adapting not just to a few new situations but to a large number of changing situations and demands. Industrial patterns in the way we have worked, learnt and lived were based on discrete units of time, discrete blocks of space and clear spatial zoning. Patterns in the Information Society are, in contrast, blurred and turbulent.

This can be seen in the changing relationships between work and non-work, between employee and employer, between entrepreneur and customer, between the workplace and other places. Not just because different people and different places can exhibit a variety of roles and uses, but also because there is often much uncertainty as to which role or use is actually in play. The so-called 24-hour society in which there is a tendency towards around the clock availability of services and where people can undertake chosen activities, including working and learning, at any time, are important aspects of this development[14].

In this situation, society, as well as the individuals within it, need to recreate a new series of balances, often from scratch as there are few precedents to guide us. We need new types of boundaries in space and time, for example between work and private, family and community life, where these activities are not necessarily completely separated as in the past, but where choice and complementary are paramount. We need new concepts of time budgeting and time policy, for example, to counter the feeling many have that the time-saving technology is in fact leaving us with less time and more stress.

The psychological and identity problems many experience in these new situations require new approaches to the creation of individual and community structures of time and space, particularly in relation to work. This must be part of a new perception of work, life and learning, supported by policy and legal frameworks, but which also permit diversity[15].

1.4   The Telework Status Report 99

The future task of the European telework community, in partnership with the European Commission, is now to mainstream new methods of work so that it touches the everyday reality of most of Europe's workforce, enterprises and administrations. The new IST (Information Society Technologies) Programme, specifically

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[13] Reported in "The Economist", 1 August 1998, page 59. For other examples see the "FUNctional Office" case study in the Netherlands (section 3.11 below) and the "Fast Company" magazine, August 1998, describing Nortel's new corporate headquarters located outside of Toronto, Canada.

[14] See *The 24 Hour Society* by Leon Kreitzman, Profile Books Ltd., 1999

[15] See the *Information and Communication Technologies and the Information Society Panel Report*, Institute of Prospective Technological Studies, Seville, Spain, part of the European Commission's Joint Research Centre's *Futures* Programme, April 1999.

Key Action II in which first projects are expected to be contracted before the end of 1999, the social dialogue process and the Structural Funds, the policy process and the Information Society Forum, are all now working in harmony to this end. It is important that we seize this unique opportunity together by stepping up all our efforts.

There are still many practical technical difficulties associated with telework resulting in many frustrations for users. The challenge ahead in the next few years, especially in relation to telework in the IST Programme, is not one of persuading people to struggle, as we often do today with PCs and modems and often inadequate technical tools, but rather to push ahead with technology development to make tools much more usable by most people in their working environment This will make it very much easier to predict and guide the social and organisational changes which will produce the new jobs and the new productivity we need.

This Status Report provides a snapshot and overview of the status of European telework, and of European Commission activity related to telework, at mid year 1999. Following this introduction, there are four main sections, each contributing to an overall description and analysis of European telework today, as well as anticipating future developments.

Section 2 summarises, and provides an overview of, the technologies enabling telework. Mid 1999 is an apt moment to construct such a synopsis as the research and technology developments activities of the Fourth Framework Programme (especially from ACTS, ESPRIT and the Telematics Programmes) wind down and the new Fifth Framework IST Programme prepares to take over. This is a useful stock taking and constitutes both a backward and a forward look at the technologies and how they relate to new methods of work.

Section 3 provides a status review of telework throughout Europe, including the latest quantitative estimates of the take up of telework in different countries and internationally. As well as a summary assessment at European level and the first publication of the results of a major new European survey, this section examines the situation in each member state in the context of European and international developments, as well as assessing the telework status in Central and Eastern Europe and in our main competitors in order to provide an international benchmark. A round-up of major European telework events over the last year, including European Telework Week 1998 and the European Assembly in Lisbon in September 1998, is also provided.

Section 4 examines the European Commission's role and its initiatives regarding European telework, both in relation to its research agenda (particularly the now on stream Fifth Framework Programme for Research and Technology Development, 1999-2002), as well as to its overall policy frameworks and the application of structural funds. For each of the Commission's major policy areas, activities related to telework are assessed and the progress and achievements are summarised.

Section 5 looks to the immediate and medium-term future, and particularly at policy and market developments for telework and related tele-activities. Major events and initiatives for the rest of the year are highlighted, including the European Telework Agenda, the Telework Assembly in Aarhus, Denmark, in September 1999, and European Telework Week during the first week of November 1999.

The *annexes* include more detailed and structured information, including reports on European Telework Week 1998 and overviews of telework-related projects, resources, publications and references. This demonstrates the wide ranging nature of telework activity in Europe, and provides access to the main data available, as well as the people behind them. It is based on the significant contribution being made by many people all over Europe, together with the European Commission.

2   Technologies and social changes enabling new ways to work

This section links evolution in our attitudes to and understanding of technology to related changes in how we work. as they affect new ways of working and doing business, and create opportunities and demands for a range of different approaches to telework.

2.1   Changing attitudes to technology

The evolution of teleworking (see Section 1.3, *Telework in flux*) has been accompanied by an evolution in attitudes to information and communications technologies (ICTs). Indeed telework itself has influenced public attitudes to ICTs; telework was one of the first developments in the business use of ICTs to be led by individual "users" rather than by computer specialists or company strategists. Media coverage of early telework activities emphasised the personal aspects of lifestyles, families and the home setting; early teleworkers were often the first people in their community to invest in a home computer for "serious" (ie work) purposes rather than as amateur computer specialists or hobbyists. The idea of a "personal" computer was still new; previously only companies owned computers, and IT specialists rather than "ordinary users" mainly decided on their use.

Today's response to technological change is profoundly different. On average around one in four European households already owns at least one personal computer[16]; in some countries this rises to more than 50% - in some local communities it approaches 100%. The computer has changed from being something imposed by "the management" or the computer department to become - for many people - an everyday tool through which we apply our personal know-how and skills to achieve results, find out things and have fun. People who buy these tools for their own use at home develop their own perspectives and expect to influence how they are used at work.

In the 1990s this change from "passive user of whatever is provided" to "active chooser" has embraced communications services, applications and devices. At the end of the 1980s most European households had just "a telephone" and basic "telephone service", usually supplied as a single package by *the* "telephone company". As telecommunications liberalisation takes effect the European consumer can and does choose between different suppliers of basic telecom services, different types of services and connections and a wide and increasing range of communications devices. The popularity of the Internet has reinforced the trend for "information" and "communication" devices to link or merge and has increased our willingness to buy and use the new technologies. The popularity of mobile telephones has sharpened the focus on providing in smaller, lighter and fully portable form all the technology we now expect to find on our office desks or in our homes - including technologies we buy for leisure and pleasure as well as for business and work.. (See table below).

In the 1970s and early 1980s there was much discussion of "technophobia" - fear of new technologies. In reality the fear and concern was about the individual's inability to manage and control the technology and its implications, at a time when relatively few people had first hand experience as "choosers and users". At the end of the 1990s, this has been largely replaced by a social concern about people who cannot understand and use the technologies (or who cannot afford to acquire them) - the so-called "information have-nots". The general expectation is that in the developed economies ICTs and their use are already and will increasingly become part of the social fabric. Every household will have Internet access as well as access to digital TV and radio. ICTs will be built in to business and consumer items such as cars and copiers, refrigerators and radios, even shoes and spectacles. The question has changed - from "Will we have them and use them?" to "How will

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[16] EITO forecast 1998

we use them and what results do we want to achieve". In the context of this status report, "How can the new technologies contribute to improving employment and the way we work?".

Percentage take up of various ICT devices by households in Europe
Source: Eurostat Information Society Barometer 1998

% in hh	PC	CD Rom	Modem	Internet	Mobile
Belgium	33	19	10	8	26
Denmark	57	45	25	25	43
Germany	31	23	10	7	19
Greece	12	7	2	3	29
Spain	28	18	5	5	26
France	23	17	6	4	26
Ireland	26	17	9	8	28
Italy	27	17	7	6	44
Luxembourg	43	35	15	14	37
Netherlands	59	40	25	20	24
Austria	31	24	10	7	36
Portugal	18	11	4	3	30
Finland	39	27	18	17	64
Sweden	60	50	34	40	60
UK	35	20	9	11	32
EU15	31	21	9	8	30

2.2   User perspectives on new technologies

Two contrasting perspectives emerge from the pace of technology change. The first *is "the buyer's dilemma*", a problem well known in business for about thirty years and now confronting every consumer: "Should I buy today, knowing full well that either next week or next month I could buy the same capability at a lower price or better capability at the same price?".

Throughout history we have generally expected prices to rise in the short term - sometimes slowly, sometimes quickly. Technology developments have always led to cost reductions, but in previous technologies significant changes have usually taken years or decades to feed through to the market and the buyer. With ICTs in liberalised markets their effects are seen every day. The first "business PCs" were introduced at more than € 10,000 in terms of today's costs; current models can be bought by individual citizens at below one tenth of that price and have perhaps 1,000 times the capability. In mobile communications we have gone from high priced devices and services for executives to phones for students and children in just a few years.

The second perspective is "*the expert user's frustration*". The expert user stretches the technology to it's limits and knows that better technology is already available but is either not on the market yet or hasn't yet come down to an affordable price. This problem is becoming clearly visible to active Internet users - they want faster communications; they know that much faster communications technologies are already available; they are waiting for a supplier to provide the capability in a usable way at an affordable price.

These different perspectives reflect very wide variations in understanding and use of technology, both by organisations and by individuals. As an illustration of this, two people who have the same general requirements and use the same technology may have sharply contrasting experience. Take email as an example, and two users of the same package and service. The first has taken the time and trouble to

understand and use all the facilities. Incoming mail is pre-sorted into the appropriate topics and priorities. Mail from selected people is highlighted for priority attention. Notices and discussion messages from lists are stored for later review. Junk mail is automatically deleted on arrival. This user knows what today's technology can do and what it cannot do. He or she is getting all the benefits of time savings and improved communications and is actively seeking further improvements. Our second user's situation is very different. All arriving mail comes into a single "in-basket" and is presented "as is" - important messages from key people mixed with routine notices, discussion messages, junk mail. Both users may get the same volume of mail; one is highly satisfied and actively extending the use of email and "online outreach", the other is overwhelmed by "too much email" and "too much junk".

New technology has something to offer both users. For the first user, new features such as audio and video embedded in email, enabled by faster communications, higher performance processors and cheaper storage with faster access speeds. For the second user, improvements in the usability of software, such that the application we are using senses more accurately when we need advice about it's capabilities and presents that advice in a more immediately useful way. This too needs better hardware performance and capacity as well as continuing enhancements in the software developer's understanding of user needs and preferences, plus of course higher levels of "intelligence" in the software itself.

This example from email applies equally to all uses of technology - from website design, engineering and content structure to online searching; from making the "deeper" functions of mobile phones more visible and usable to making it easier to connect to the Internet on the road, in your hotel, in the airport lounge or on the aircraft itself. A clear focus of the ICT and information society work in Europe's Fourth and Fifth Framework Programmes (Section 4 of this Status Report) is on bringing together the widely varying needs of users with the research and development activities of suppliers. Strong user engagement is a key requirement for project proposals in most aspects of the new Information Society Technologies programme, and this includes new and inexperienced users and well as the more advanced pioneers.

2.3   Technology change and how we work

Social, cultural, economic and regulatory factors determine how we organise our business and our work. Technology change opens up opportunities for new working methods in three main ways:

1. Technology enables *existing activities to be done more quickly, more consistently and at a lower cost*: this means we can achieve more for the same expenditure in time, effort and cost, or we can achieve the same result for lower effort and cost.
2. Technology enables *activities to be undertaken at a distance*, which previously had to be performed at a particular place*.
3. Technology enables *new activities* to be undertaken, which previously were impractical because of either the cost or the effort required.

New ways of working can emerge through the application of any combination of these effects. In the earliest applications of technology to office and information work, the main emphasis was on the first factor and the main work impact was on clerical-level jobs. For example, the introduction of photocopiers reduced demand for copy-typists, and the introduction of payroll and accounting systems reduced demand for ledger and book-keeping clerks. Subsequently, the focus shifted from cost reduction to results improvement; for example spreadsheets enabling managers and professionals to model and explore a range of different scenarios before committing to a particular decision and plan.

2.3.1   *Changing the process and changing who does the work*

Today the emphasis of both technology development and its application to work is very much on the second and third factors, while continuing to look for cost reduction or performance improvement as an outcome. Widespread awareness and use of the Internet has created a focus on the role of technologies in "the death of distance", while rapid adoption of the World Wide Web has stimulated attention to innovation in business methods.

One result of this has been to shift focus from the simple, in-house improvement of existing activities towards more radical questioning of whole processes at the organisation level. Instead of asking "How can this be done better?" we tend to ask "Does this activity need to be done at all?" and, if the answer is still "Yes", we question whether its still needs to be done by existing staff in the existing context or can be "re-engineered" in a more radical way.

The result can move work tasks outside the company altogether - either by outsourcing to a specialist enterprise, or by shifting the task to the customer or a supplier. For example, "Hole in the Wall" cash dispensing and teller machines allow the customer to interact directly with the Bank's computers rather than this being done by Bank staff. Full online banking widens the scope of tasks that the customer can do direct and further reduces the data handling work of the Bank's paid staff. To some extent, all forms of electronic commerce share this effect of the customer or supplier directly interacting with the supplier's systems and effectively "moving the work".

Another commonplace example is the increasing trend to book and pay for travel tickets online direct with the airline concerned. This moves work to the customer, either from the airline's own booking staff or from a travel agent intermediary. In most cases customers don't perceive it as "work", rather they perceive a more direct and swifter access to the service.

In some cases the customer's effort is directly recognised and rewarded - by a discount on flight costs or by better terms for bank deposits or lending. In almost all cases, these changes result in a relative reduction in the proportion of clerical or mechanical/routine work done within a company, with a relative increase in the proportion of managerial and professional work and in the proportion of total effort committed to innovation and change rather than to sustaining existing methods. This in turn increases the potential for teleworking, since almost all managerial, professional and innovation jobs include a high proportion of work that is "location-independent".

2.3.2   Changing the focus of where the work is delivered

A further impact of online transactions between suppliers and customers is to bring into focus the need for many enterprises to take an international or global rather than a local or national approach to their business opportunities. When a company offers products and services through a website, any Internet user anywhere in the world can visit that website, find out about the products and services, and present themselves as a potential customer.

All previous forms of promotion and advertising have entailed some degree of geographical focus to the sales message; the web inverts this assumption. Customers finding a website assume they can do business with the company concerned unless the company explicitly states that it only supplies within a particular area. Of course, the opportunity may well be limited by other factors. For example while some people are happy to buy some kinds of products or services "on line" in what is for them a foreign language, most people expect to be sold most products and services in their own language.

Here again a combination of technology and telework becomes attractive to the company that has been alerted to the opportunities. Machine translation facilities can now be integrated into both websites and browsers, so that (for example) a German-speaking user can view a French language site in "machine translated" form, at

little or no cost to either the site owner or the user. The machine translation may not capture the nuances of a sophisticated sales message, but is certainly good enough for the user to understand what is being sold at what price and on what terms - especially if the site owner has been careful to use "plain language". Using telework, the site owner can of course contract with one or more native German speakers resident in Germany to "spruce up" the machine translated text and provide German-speaking customers with a more effective German-language presentation.

This is a good example of technology enabling new activities that previously were impractical - it is now within reach of even the smallest company to present its goods to audiences in many countries and many languages at a reasonably modest cost. There remain, of course, costs and complexities of export procedures, shipping etc; but within the European Union these should be a minor barrier that will gradually be eroded. Even for international trade the infrastructure and support provided by global logistics companies such as UPS and TNT now make it easier for the small firm to handle export business. These companies in turn use technology to optimise the service/cost mix for their customers.

2.3.3   Location-independent working

Technology also constantly changes the boundary defining whether a particular job or task is "locally fixed" (ie it requires the personal presence of the person at a particular place) or location-independent (it can be done anywhere, to suit the employer or the person doing the work).

A dramatic example of this is medical surgery. Ten or even five years ago we would have taken it entirely for granted that surgery could only be performed with the surgeon and the patient physically present in the same operating theatre. Our only image of surgery was that of the surgeon wielding "the knife" and working directly on the patient's body.

Today, however, some of the most advanced surgery involves remote control by the surgeon of self-powered instruments. This is currently "close up" - the surgeon and the patient are together, but the surgeon is not touching either the patient or the instruments (miniaturised semi-robotic devices). "Distance surgery" is coming. Already there are hundreds of examples world wide of using video and data communications for a distant expert to provide "over the shoulder" advice to a paramedic or general practitioner on the spot; the step from this to direct intervention at a distance is a matter of technology enhancement, confidence, experience in research situations, and regulatory evolution. The example of surgery illustrates how technology enables almost all work to be done "at a distance".

2.3.4   New kinds of enterprises and new kinds of work

"Web weavers" working in "web services companies" provide an example of new kinds of work in new kinds of enterprises. "Web weaving" combines an understanding or and interest in current and emerging technologies with an understanding or and interest in new ways of communicating with people and organisations. We need people who are "good with technology" and "good at communicating" and have a "good understanding of the online environment and how people respond to it.

This is the kind of combination we might have sought in one IT strategist or IT executive per large company ten years ago. We would have put expensive head-hunters on the task of finding such a person. We would have expected to pay high salaries and offer tempting benefits. Today, even the smallest company that hopes to succeed in the online marketplace needs to find or grow such people. The skills mix needed for success in business is changing rapidly; work opportunities for people who develop the newly important skills are very wide indeed.

Equally, new kinds of companies are emerging. Late in 1998 the UK consumer electronics retailer Dixons set a new trend in Internet services by launching a "Freeserve" offering - Internet service for consumers completely free of charge, with consumers paying only the cost of a local phone call, billed by their existing phone service provider. In July 1999 this had become an arms length subsidiary, capitalised in the market at € 3 billions[17]. This is just one example of many thousands of new enterprises, large and small, that have already emerged across Europe in the early stages of the Information Society.

2.4   Mapping telework requirements to technology and infrastructure development

Success in meeting the needs of New Ways of Working in the IST Programme (see Section 4) requires continuing effort to understand user needs and to develop effective models linking user needs to technology development and deployment. One such model was presented at the European Commission's Telework Information Day on 1st June 1999.

The model suggests identifies two major factors affecting how individual users perceive and apply technology in the working context: their *relative degree of control* over the environment in which the work takes place and the *relative degree of mobility* while working.

The first figure illustrates degree of control. An individual has the highest degree of control when working at home in "defensible space" - that is, a room that is only used by the person concerned, who chooses the technology and how it is used. A similar degree of control is enjoyed in the "private" office of an executive, who has considerable leverage over technology provision compared with (say) a clerical worker on "the shop floor". Degree of control reduces progressively until it becomes very low. For example someone working in the public departure lounge of an airport while waiting for a delayed flight may control the use of their personal equipment (eg a laptop computer) but may be unable to do routine tasks such as email exchange because of poor local signal strength of the GSM network in a room that may be heavily shielded.

Defining the telework context for technologies and infrastructure

uninfluenced

Degree of control of environment

controlled

walking in public place

first class aircraft seat

on the road - rental car

sitting at own desk   walking within own office   on the road - own car

fixed   Degree of mobility   in transit

Source: European Telework Online - http://www.eto.org.uk
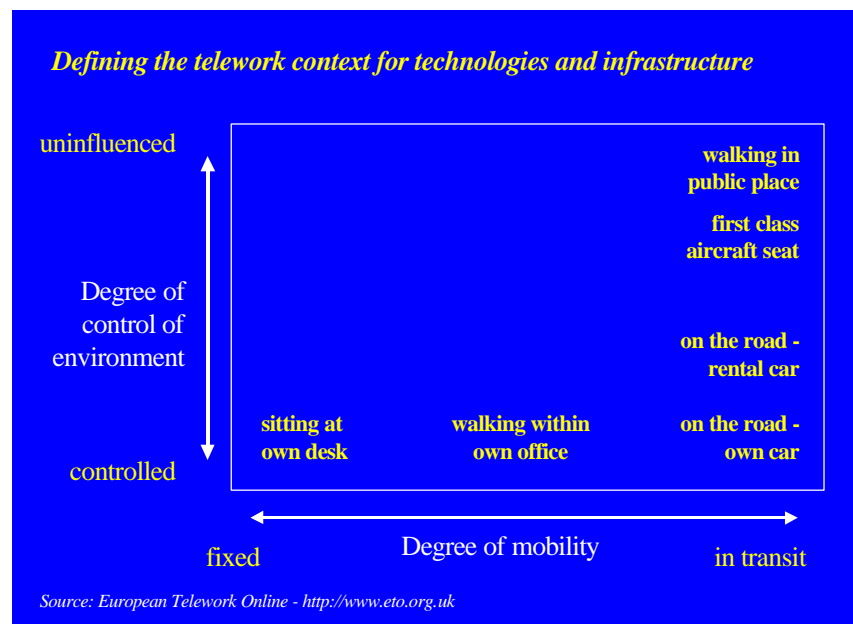
The second figure illustrates degrees of mobility and links this with degree of control. A individual sitting at their own desk may be regarded as "fixed" from both a local and wide area networking standpoint. The individual walking about their office or the office building is mobile locally but fixed geographically. An individual driving their own car is highly mobile but retains considerable control of the work environment, though communications aspects are determined by the quality and extent of the chosen network service. The extreme case of high mobility/low control is the individual walking in a public place, where one becomes very

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[17] The real underlying value of "Internet stocks" is controversial. However, Freeserve, which signed up some 1.3 million users in its first ten months of operation, does employ significant numbers of people as well as actively encouraging the spread of e-business and new methods of work by making it more attractive for consumers and companies to use the Internet.

dependent on the infrastructure and services provided by both public authorities and commercial suppliers. Travelling on public transport is an intermediate level; to some extent the user can choose which service to use according to the facilities provided. For example the airline SAS has for quite some time provided telephones "at the seat" for airborne business travellers, while many airlines continue to provide no telephone facilities of any kind. Provision of information society facilities and support for people "on the move" and "away from base" will increasingly become a competitive advantage for those companies that best understand and meet the need.

Defining the telework context for technologies and infrastructure

uninfluenced

Degree of control of environment

in control

airport departure lounge

hotel room (budget)

hotel room (business class)

private office
(ie senior person/not open plan)
home
(with defensible space)

fixed   Degree of mobility   in transit

Source: European Telework Online - http://www.eto.org.uk
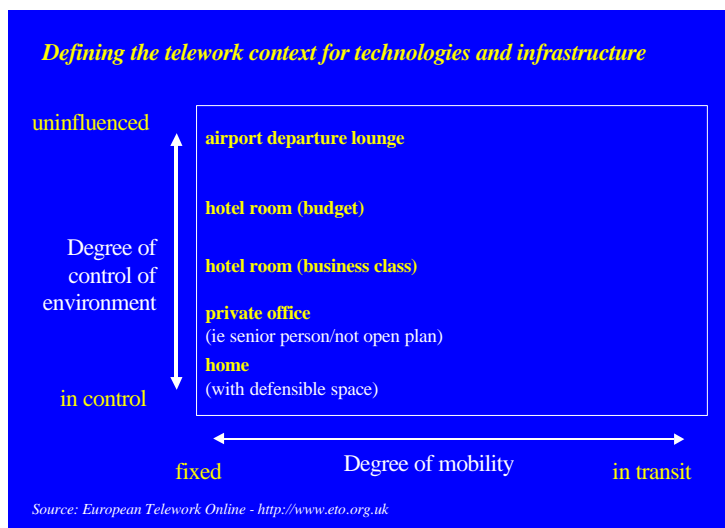
The market response combines actions by users as well as by suppliers of devices and infrastructure/services as shown in the third figure.

Towards the top right hand corner of the model (higher mobility coupled with relatively low individual control of the environment), telework development becomes more dependent on infrastructure investment.

This is influenced by public authorities as well as by industry - for example local authorities cooperating with GSM or UMTS services providers to provide local high performance access in the street and in and around public buildings. It is influenced by many industries other than the ICT

Defining the telework context for technologies and infrastructure

uninfluenced

Degree of control of environment

in control

Higher dependence on infrastructure investment (public, private)

Higher dependence on individual/enterprise investment

fixed   Degree of mobility   in transit

Source: European Telework Online - http://www.eto.org.uk
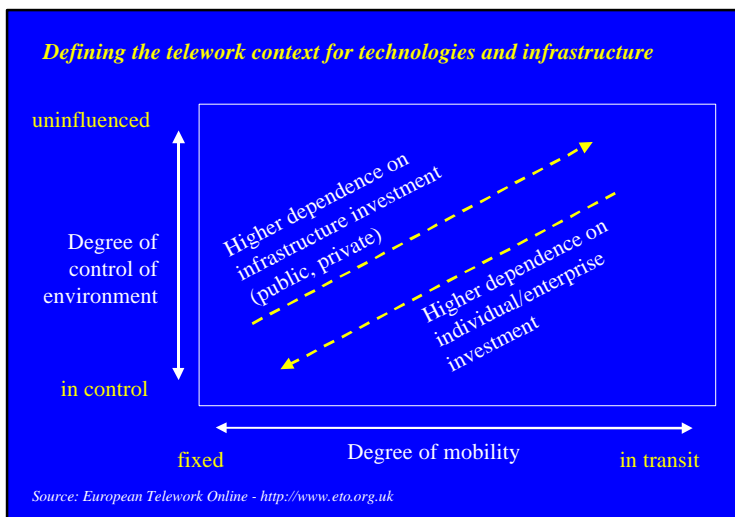
sector, for example the hotel, leisure and travel industries, the motor industry, regulators and owners of roads, railways and other transport infrastructure. As we approach the bottom left quadrant (low mobility with high individual control) the dependency shifts towards users of the technology - both enterprises and individuals.

The initial introduction of new products and services depends on investment by suppliers in development and marketing; success in the market and subsequent demand and investment is led by the enthusiasm or otherwise of users. Mobile telephony has been a good illustration of user response pulling increased investment in enhancement and cost reduction. Video conferencing has been in the market as long as mobile phones but, in contrast, has enjoyed reasonable success in large enterprises that have multiple locations but very little take up by smaller firms and individuals, even when packaged as a "plug in and go" consumer product.

Researchers, developers and suppliers need to more fully understand how individuals apply today's technologies and how they make decisions about new devices and services. This is an important focus of the socio-economic research aspects of New Methods of Work in the Information Society Technologies Programme (Sections 4 and 5).

2.5   Technology in context

The fact that something can be done does not mean it will be done. Technology *enables* new ways of working and doing business; social, cultural, economic, regulatory and fiscal factors - plus of course our personal and organisational preferences and expectations - *determine* what actually happens. Europe presents great diversity in our existing use of technologies in business and work; much of this diversity is a healthy sign of freedom of choice and our richly varied cultural and social heritage. The important thing for all European enterprises and citizens is that we continue to have and exercise freedom of choice. This means continuing efforts to make sure that new technologies and services are available and affordable - on the islands of Greece and in all our small rural villages as well as in the economic centres of Frankfurt and London and in the information-rich economies of Scandinavia.

We must also be conscious of how our use of technologies compares with that of other world regions, particularly the USA and other highly developed economies. As shown in Section 3, Europe currently uses less technology overall than the USA on a pro rata basis, and invests less per capita each year. This overall pattern conceals wide variations between countries and among regions within the same country; if all countries and regions were moving as quickly as Europe's leading user areas we would be at least comparable with the USA and in some aspects ahead. Since the effective use of technology has a substantial impact on competitiveness, it is essential that those areas of Europe with below-par technology infrastructures and investments make faster progress. At the same time, Europe can gain great strength in richly diverse global markets from the rich diversity of our national and local cultures and economies - technology must always remain the servant of progress not it's master.

3   Status of European telework

3.1   European overview

European telework in 1999 is in a period of fast growth and rapid flux. As we approach the third millennium, there are over 9 million Europeans engaged in new working practices directly involving the use of networked technologies. In the 1997 and 1998 Telework Status Reports, the level of teleworking across Europe was reported as between 1.5 and 2 million and about 4.6 million respectively. Today, in 1999, this level may have doubled, although there is considerable evidence that the numbers were seriously under-reported in previous years. Moreover, even this level is almost certainly only the tip of the iceberg in terms of developments we can expect over the next few years. And, although these data hide substantial variations across the Member States, this is leading to the most substantial change in working practice for a very long time which will come to affect almost everybody in Europe at some stage in their working lives over the next five to ten years.

In this sub-section, the rapid growth in the numbers of European teleworkers is examined together with an analysis of the various common types of telework. This is followed by a review of some of the main trends characterising the situation in 1999 and of how telework, in many contexts, is becoming indistinguishable from other Information Society developments to which it is intricately linked.

3.1.1   How many and what types of teleworkers?

As described above, the take-up of telework in the European Union continues at a very rapid pace. The results of a new survey, undertaken by the ECaTT project[18] and conducted uniformly across 10 of the 15 Member States, are being published for the first time in this Status Report (see Table 1 and the accompanying note on the data). The benefits of these new data are many. They are built on a similar survey conducted in 1994, and are based upon standard scientific methods using the same definitions and methodology in each country surveyed, thus making them directly comparable between countries. There remain, of course, problems to do with how definitions and survey questions are interpreted in different countries and whether or not they are always appropriate in a particular cultural and labour market context, but this will always be the case regardless of the survey methods adopted. Another great benefit of these data is that they measure four different basic types of telework, again directly comparable between countries.

The ECaTT data show that, in 1999, there are from 6 to over 9 million Europeans engaged in new working practices directly involving the use of networked technologies. The difference between the two figures depends upon the degree to which telework methods are being used. Over 6 million Europeans are teleworking in ways which significantly affect their working lives and the organisational arrangements adopted. These data are comparable to the ad hoc survey data collected by the European Telework Development (ETD) project[19] for 1998/99 (see Table 2 and the accompanying note on the data), which show about 6.7 million Europeans substantially using the techniques of telework. In addition to this general level of teleworking, however, the ECaTT data show that another 3 million Europeans have also started to employ teleworking techniques in practice, but in ways which may not yet be significant, although all evidence shows that once people start to telework the vast majority continue to do so and, indeed, rapidly increase their use of these methods. Furthermore, the ECaTT survey shows that a further 60% of workers not yet teleworking are interested in doing so in the future. Thus, future growth potential is great.

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[18] The ECaTT project (Electronic Commerce and Telework Trends: Benchmarking Progress on Electronic Commerce and New Methods of Work) is co-funded by the ESPRIT-Programme and the ACTS-Programme of the European Commission.

[19] The ETD project is co-funded by the ACTS-Programme of the European Commission.

Table 1: Telework in Europe 1999 (from ECaTT surveys undertaken by © *empirica*)											
	1) home-based telework		2) self-employed in SoHo		3) mobile telework		4) Sub-total of columns 1-3 excluding overlaps		5) supple-mentary telework		TOTAL TELEWORK (sum of columns 4 & 5)	
	'000	% work-force	'000	% work-force	'000	% work-force	'000	% work-force	'000	% work-force	'000	% work-force
Austria *)												
Belgium *)												
Denmark	121	4.54	37	1.38	56	2.08	176	6.58	104	3.90	280	10.48
Finland	142	6.71	47	2.24	55	2.61	229	10.80	126	5.96	355	16.77
France	272	1.23	45	0.20	182	0.82	499	2.25	136	0.61	635	2.87
Germany	538	1.53	536	1.52	520	1.47	1,562	4.43	570	1.61	2.132	6.04
Greece *)												
Ireland	14	1.01	8	0.56	4	0.31	26	1.88	35	2.56	61	4.44
Italy	315	1.57	90	0.45	270	1.35	584	2.92	135	0.67	720	3.59
Luxembourg *)												
Netherlands	285	3.96	166	2.31	308	4.29	593	8.25	451	6.27	1,044	14.53
Portugal *)												
Spain	162	1.28	32	0.26	65	0.51	259	2.04	97	0.77	357	2.81
Sweden	207	5.29	61	1.55	90	2.31	313	7.98	282	7.19	594	15.17
UK	630	2.37	234	0.88	550	2.07	1,273	4.78	754	2.83	2,027	7.62
*) estimate	259	1.62	129	0.81	205	1.28	534	3.34	270	1.69	804	5.03
TOTAL EU	**2,946**	**1.96**	**1,386**	**0.92**	**2,305**	**1.54**	**6,049**	**4.03**	**2,960**	**1.97**	**9,009**	**6.00**

Table 2: European Telework Development estimates, 1998-99 (from different quantitative and qualitative surveys and analyses in each country)			
	'000 1998/99	% workforce 1998/99	% increase over 1997-98
Austria	67	2.0	+ 33
Belgium & Lux.	250	6.2	+ 25
Denmark	300	11.6	+ 20
Finland	220	10.0	+ 59
France	420	1.8	+ 67
Germany	1,800	5.1	+ 53
Greece	50	1.3	+ 160
Ireland	58	7.1	+ 16
Italy	350	1.7	+ 40
Luxembourg	-	-	-
Netherlands	1.200	18.2	+ 100
Portugal	100	2.2	+ 67
Spain	120	0.9	+ 50
Sweden	300	9.0	+ 67
UK	1.455	5.5	+ 13
-	-	-	-
TOTAL EU	**6.690**	**4.5**	**+ 45**
USA	15.700	12.9	+ 42
Japan	2,090	7.9	-

The data and results have been taken from the ECaTT project (ECaTT: Benchmarking Progress on Electronic Commerce and New Methods of Work) which is led by empirica GmbH, Bonn (Germany). The project is co-funded by the ESPRIT-Programme and the ACTS-Programme of the European Commission. **© empirica**

USA source: Cyber Dialogue, New York, mid-year 1998 telecommuters: http://www.cyberdialogue.com/press/releases/ telecommuting.html

Japan source: Wendy Spinks (note the data shown are estimated for 1999 on the basis of a 1996 survey and show full-time white collar employees only, including both regular and sporadic teleworking)

See a note on the data on next page.

European Telework

A note on the data

Table 1:

Shows data for 10 EU countries surveyed and analysed in 1999 by the ECaTT project (ECaTT: Benchmarking Progress on Electronic Commerce and New Methods of Work) which is led by empirica GmbH, Bonn (Germany), as a follow-up to the TELDET project in 1994. Data for the remaining 5 countries have been estimated on the basis of their similarity to other specific countries surveyed. The data are drawn from a scientifically verified General Population Survey using representative samples based upon quotas along major criteria of people over 15 years of age. The data were collected through computer-aided telephone interviews of about 1,000 people in the larger countries and 500 in the smaller. The overall number interviewed in the 10 countries was 7,700.

Four basic categories of teleworkers, all using ICTs as essential tools to carry out their work, have been surveyed:

1.   home-based at least 1 full day per week: working at home (which is not the normal place of work), or permanently working from home and employed in paid work for an employer
2.   self-employed (or effectively self-employed because owner, partner, associate of company) in SoHos, i.e. Small Offices Home Offices: normal place of work is in home-based office
3.   mobile: at least 10 hours per week spent away from home and/or main place of work
4.   supplementary: as 1 but working less than 1 full day per week at home. These are individuals for whom telework is not yet significant but who are starting to experience the changes, benefits and issues thrown up and are thus likely to embrace telework more fully in future.

Note, that category 3 is not mutually exclusive with categories 1 and 2. Individuals who are either home-based or self-employed teleworkers can also appear in the mobile category if they satisfy the relevant criteria. This means that the sub-totals data (column 4) are less than the row totals in columns 1-3 to avoid double counting.

The value of the data in Table 1 are their scientific basis using standardised definitions and representative samples. They thus provide accurate estimates of different categories of teleworkers and direct comparability between countries.

Table 2:

Shows data collected through European Telework Development's National Coordinator network and other sources, where telework is very broadly defined to include working at home for some or all of the time; mobile teleworkers; people using the techniques of telework in call centres and similar organisations; virtual and networking organisations relying upon network technologies to conduct their business with customers, suppliers and partners; as well as freelance and independent on-line workers. Evidence from most countries indicates that these estimates are likely to be conservative.

In most cases these data are based upon quantitative national surveys, backed by qualitative interpretation by experts. However, in some cases the surveys have used very small samples (such as in Ireland) and generally the definitions and methods used are not directly comparable (hence the broad, all inclusive definition) so that no accurate international comparisons can be made (unlike with the data in Table 1). The value of data in Table 2, in the absence of commonly agreed definitions and trans-national surveys, is that they give an idea of overall orders of magnitude of the extent of teleworking in Europe very broadly defined, and provide a benchmark comparable with the EITO mid-term estimates[20] which has been repeated over a number of years, thus enabling rough estimates of the growth of telework year on year.

The useful aspect of the ETD data is that they are generally comparable with similar data sets collated in both of the previous two years. The 1998/99 data show an increase of about 45% on 1997/98 and over 300% on 1996/97. These very rapid increases are in line with the European Information Technology Observatory mid-term estimates (see Figure 1 below).[3] A similar growth on last year was achieved in the USA where about 12.9% of the workforce are now teleworking.

There are clear distinctions between different types of telework shown in the ECaTT data. Table 3, shows that at the European level, home-based telework, where an individual is in paid work for an employer, still constitutes the most common single form but is now less than 50% of total telework. Not far behind are mobile forms of telework being spurred on by the huge increase in the number of mobile applications being purchased in Europe enabling people to log on to the network wherever they happen to be, whether using mobile devices or fixed lines. Self-employed individuals setting up SoHos are also increasing in number and show the growing

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[20] European Information Technology Observatory 98, page 300 in the section *Telework: Status, Development and Issues*.

importance of this type of free agent working relationship. It is clearly also possible for some of the mobile teleworkers to simultaneously be home-based or self-employed teleworkers, so that some double counting of individuals is taking place. Column 5 of Table 3 shows the extent of this double

Figure 1   Telework development by segment 1994-2000

Telework development by segment (EITO mid-range estimates)
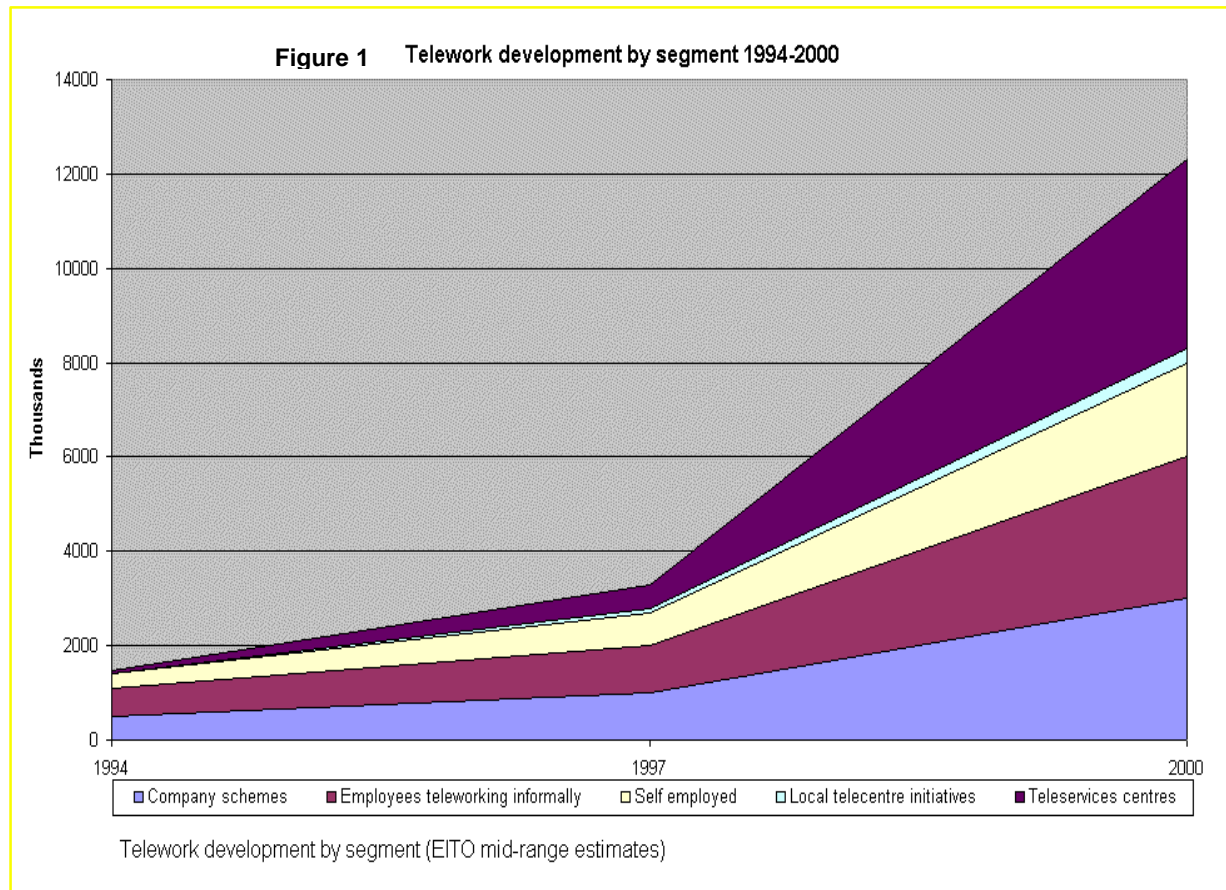
counting: for the EU as a whole about 10% of teleworkers are practicing more than one type of telework. This is also a measure of individual flexibility between types of telework.

In Table 3 the data are also grouped according to major European regions in order to make it easier to see geographical variations. The distinctive north-south differences in the take up of telework in Europe are clearly shown (column 1). There are also strong differences amongst the main regions of Europe regarding the split between the three different types of telework, as shown in columns 2 to 4:

▪   In *Scandinavia* (Denmark, Sweden and Finland), with the highest overall incidence of telework, home-base teleworking for an employer is still the main form, whereas self-employed and mobile forms are lower in proportion to total telework than the European average. It seems that access to high quality and generally low cost technologies, together with conducive economic conditions and attitudes to work, lead to the high incidence of telework in Scandinavia, but teleworkers in all three countries complain about the labour market regulations failing to provide for individuals wishing to take up free agent or other types of unconventional work organisation.

▪   The *Benelux* countries have a much higher proportion of non-home based telework than the European average, especially mobile forms, and also show by far the highest overlap between mobile and other types. Although there are clear differences between the Netherlands and Belgium, with the former practicing more

non-home based teleworking, both countries show this trend. It may be that these smaller, non-Scandinavian northern European countries are successfully balancing their labour market and economic policies in ways which provide basic certainty and security for individuals and enterprises, which many argue are necessary for risk taking, with sufficient flexibility to stimulate innovative work forms. More research is clearly needed on these issues.

▪ In *the UK and Ireland*, the pattern is very mixed closely reflecting the overall EU situation but with a higher preponderance of mobile teleworking and a lower proportion of SoHos to total telework. The latter may be surprising given, especially the UK's, very flexible labour market policies. This could be explained, however, by this very flexibility which, when combined with lack of clarity for SoHo formation and operation (for example, surrounding the taxing of private residences as businesses when commercial work is carried out at home), could result in some uncertainty dissuading individuals from the risk of setting up SoHos. Another factor at work here could be the general smallness of UK homes which make it difficult to accommodate home-based businesses. Individual teleworker flexibility between different telework forms is, however, greater than the European average (as it is for all the northern European countries in contrast to central and southern Europe) which perhaps reflects higher levels of personal empowerment and organisational flexibility in these countries.

Table 3: Balance between types of teleworker and European regions, 1999					
(Excluding supplementary home-based telework of employed persons, i.e. less than 1 day per week)					
European region	1) teleworkers % of workforce (excluding supplementary)	Percentage split between type of teleworker within each region			
		2) Home-based	3) Self-employed in SoHos	4) Mobile	5) Overlap (total of % in 2, 3 & 4 minus 100%)
Scandinavia	8,24%	65%	20%	30%	15%
Benelux	7,52%	49%	27%	51%	26%
UK, Ireland	4,64%	50%	19%	44%	12%
Germany, Austria	4,40%	35%	34%	33%	2%
France, Italy	2,57%	54%	12%	42%	8%
Spain, Portugal, Greece	1,87%	63%	12%	25%	0%
EU 15	4.03%	49%	23%	38%	10%

▪ *Germany and Austria* present, perhaps, some of the most surprising and interesting results. With the average EU take up of overall telework they nevertheless have a profoundly distinctive split between the different types. The proportion of home-based employee telework to total telework is much less than average, whereas the SoHos form is much greater. Mobile forms are also slightly less than average. Furthermore, there is a surprisingly even balance between each type. These data contradict to some extent previous surveys and suppositions which have proposed that, given the fairly rigid and formalised (by European standards) labour market, home-based telework as an employee was much more likely than self-employed forms. It may be that this is because Germany's SoHos are not new forms of employment as most are single or a few person enterprises which have existing as traditional self-employed businesses in all sectors for some time, and whose owners have since become teleworkers (according to the ECaTT definition) by making use of ICTs for communicating with customers and other business partners. Thus, it seems that Germany's self-employed have been better prepared for the Information Society than, for example, the British. However, Germany and Austria have virtually no overlap between telework types, so that individuals are adopting just one form rather than mixing different forms, which perhaps does reflect the rather formalised and segregated attitudes and labour regulatory regimes.

- *France and Italy* both mix characteristics of north/central Europe with southern Europe, typically manifest in their own north-south internal differences. With their comparatively bureaucratic, complicated and centralised institutional structures, which perhaps inhibit freer forms of telework like SoHos, they have a higher than average share of home-based employee teleworking compared to total telework. However Italy, though not France, is above the European average in using mobile forms, clearly reflecting Italy's love affair with the mobile phone. Individual teleworker flexibility between different telework forms is, perhaps unsurprisingly, below the Europe average, although this masks flexibility which is above average in Italy as compared to zero flexibility in France, and so is clearly another characteristic upon which France and Italy differ.

- The southern European countries of *Spain, Portugal and Greece* have a striking pattern of much higher than average home-based employee telework to total telework and much lower than average SoHo and mobile forms. These countries are, by and large, still at the stage of formalised telework trials and pilots, often spear-headed by the public sector which is typically a leader in ICT uptake (in contrast to the Scandinavia countries which have a similarly large public sector but where it is the private sector which tends to drive the uptake and exploitation of ICTs). As in Germany and Austria, individuals in these southern countries are not mixing telework forms, which in this case probably reflects the formalised and experimental nature of present activities.

3.1.2 European telework: overall trends in an Information Society context

The overall pattern of European telework in 1999, as well as showing high growth, is complex and rapidly changing. In many contexts it is becoming indistinguishable from other Information Society developments to which it is intricately linked, and this can be seen in a number of trends and issues which characterise European telework as a whole.

Qualitative evidence from around Europe shows clearly that the main drivers and characteristics of telework continue the pattern set in the last few years:
- Widespread telecoms liberalisation, and technical and market advance is driving down prices and driving up the quality and accessibility of basic technologies. Although there are still differences across Europe (for example, in Greece telecoms service liberalisation has again been postponed until January 2001), all countries are seeing real benefits as a result.
- The social partners and government are in many countries and sectors adapting to, and driving, the agenda. For example, in Denmark many sectors have now developed framework agreements between employers and trades unions which recognise and promote telework and enable teleworking employees to achieve the same or similar social benefits as enjoyed by traditional workers, and in Italy new statutory provisions promoting telework in the public sector came into force in 1998-99.
- The real benefits are becoming more obvious to a large number of employers, policy makers and the workers themselves. Many now no longer see telework as a fringe activity for a few specialists or privileged individuals, or simply a question of working at home a few days a week, but instead are starting to see how the introduction of ICTs into the workplace and into working lives is fundamentally changing all aspects of work and how an organisation competes and operates across all activities and workers.

Despite these clear and encouraging trends, however, some familiar issues can still constitute significant challenges, including:

- Large geographical variations in Europe, both north-south and east-west, the challenges of which will become more acute as the European Union widens its membership eastwards. These are not simply variations in telework take up (see Tables 1, 2 and 3) as they directly reflect, and are strongly related to, a range of other Information Society developments upon which they ultimately depend. For example, ICT

investment, the number of PCs, the acquisition of mobile phones, the number of Internet hosts (see Figure 2) and usage of the Internet by individuals, households and enterprises are strongly correlated with telework, teletrade and telecooperation[21]. Such differences can, however, also be seen as strengths, for instance, in terms of cultural and market differentiation and exploitable opportunities. Europe constitutes a test bed of cultural and market variety which is, for example, much closer to the characteristics of the total global marketplace than the relatively monolithic North American market. Coping with this and exploiting the plurality of opportunities, policies and approaches adopted, will provide Europe with many assets and advantages in the global context which it should recognise and seize.

Figure 2   Internet hosts per 1000 population, year-end 1998

Country	Value
Finland	90,0
Denmark	58,0
Sweden	44,0
Netherlands	41,0
UK	26,0
Austria	22,0
Belgium/Luxembourg	21,0
Germany	19,0
Ireland	17,0
France	10,0
Spain	9,0
Italy	8,0
Portugal	7,0
Greece	6,0

Source: EITO 1999, page 60, from RIPE
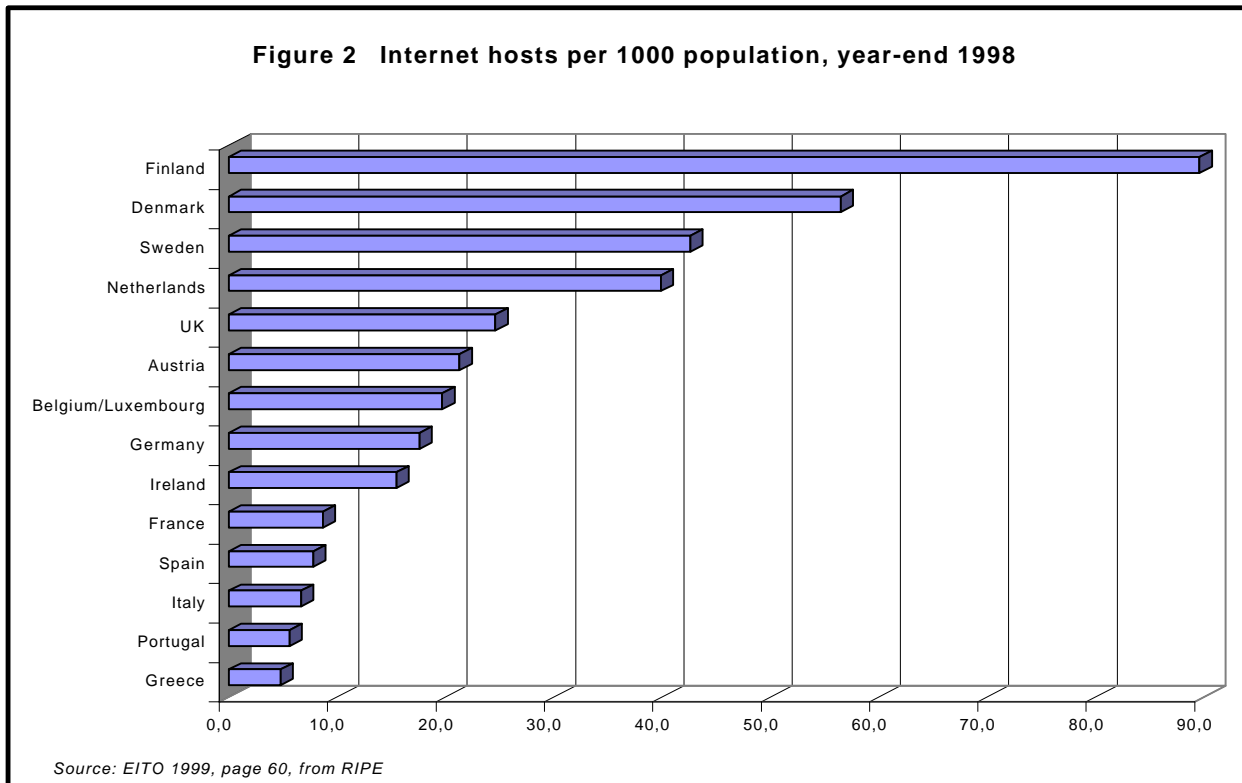
▪   There still remain some areas and sectors where technical infrastructures are not yet adequate in terms of availability, quality or price, or where the minimal physical facilities necessary to exploit telework are not present. This is the case, for example, in the UK where many homes may be too small to allow the widespread development of SoHos, or in some southern European countries where rural and other peripheral areas still have problems of connection to modern high-speed networks.

▪   Inappropriate employment legislation and regulations are still widespread. Despite important advances over the last few years there remains much to do to establish structures suitable for a future-orientated Information Society, rather than an industrial economy, in order that enabling rather than restrictive structures can be set in place which, at the same time, protect against worker exploitation or abuse.

▪   In this context, there is still much controversy in Europe about the merits and demerits of concepts like *economic and market freedom,* especially in relation to labour market regulation and social protection, and the changing and contradictory political landscape both at national and European levels will no doubt ensure that this debate is on-going. The release of the OECD Employment Outlook for June 1999, which shows that state intervention in labour markets (which is low in Britain and high in the southern European

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[21] See also, for example, the variations in percentage usage by individuals across Member States of PCs, the Internet and mobile phones, as well as many other new technologies, in *Measuring the Information Society: Eurobarometer 50.1*, published by DGXIII of the European Commission, March 1999.

countries and France and Germany) has little or no effect on either employment activity rates or unemployment, is just the latest development in the discussion and understanding of these issues. The report shows that what relatively strong regulatory policy in these areas does do is decrease labour market turnover, so that fewer individuals become unemployed but, once jobless, it takes longer for them to find new work. The report also shows that it is not the supply of labour as controlled by labour market policy which affects the number of jobs, but rather it is the demand side which is critical, so that without adequate macro-economic policies, for example in areas like economic growth and trade, there is nothing for even the most flexible jobs market to respond to. There is also some evidence in relation to productivity (as measured by GDP per hour worked) that the social protection regimes of Europe have performed much better than those of the UK, and even of the US since the 1960s, perhaps because people feel more confident of taking a risk if they know that the consequences if it goes wrong will not be catastrophic.

- As is well known, Europe lags both the USA and Japan in many aspects of the Information Society (see, for example, Figure 3). Although the significance of these differences can be overplayed, for example because even the apparent homogeneity of the USA and Japan masks some extreme internal differences when we consider them as single measurement units, they nevertheless place Europe at a real disadvantage in terms of global trade and competition. Europe needs to recognise its weaknesses in these areas at the same time as realising the opportunities its own cultural and market variety presents.

Figure 3 Per capita ICT expenditure, 1998 (Source: EITO, 1999, p. 399)
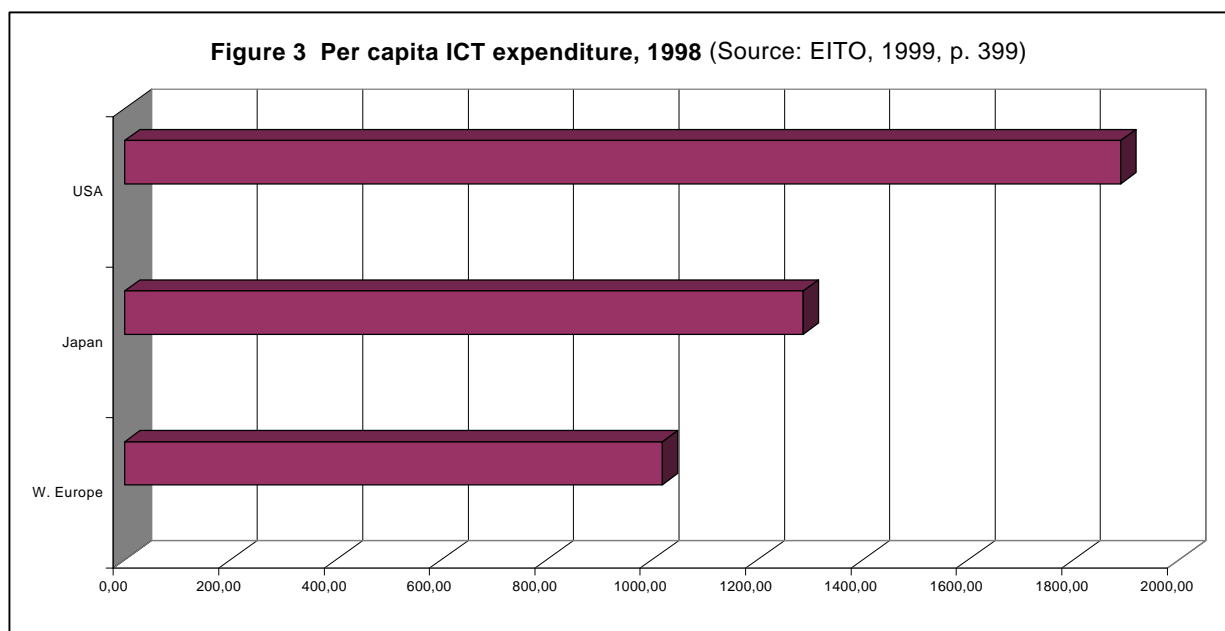
- Restricted awareness and understanding amongst many decision-makers at all levels and in all areas of economic activity is still, perhaps, the greatest barrier. However, this is changing from one where it is often not awareness of telework as such which is lacking but rather detailed knowledge and understanding of how to put it into practice. It is also changing from a general problem to one concentrated in particular sectors and economic spheres, such as the large number of traditional SMEs which still form the backbone of many local and regional European economies, for example in primary and manufacturing sectors and in low-tech service activities. The ECaTT survey also examined the take-up of telework by size of companies and found that the larger the company the greater the take-up, with the exception of very small companies (0 to 9 employees). It is likely that the latter include the SoHos referred to above, but SMEs of 10 plus employees are clearly under-represented in European telework development. (See also Figures 4 and 5 showing differences in the use of ICTs by size of enterprise in Europe.)
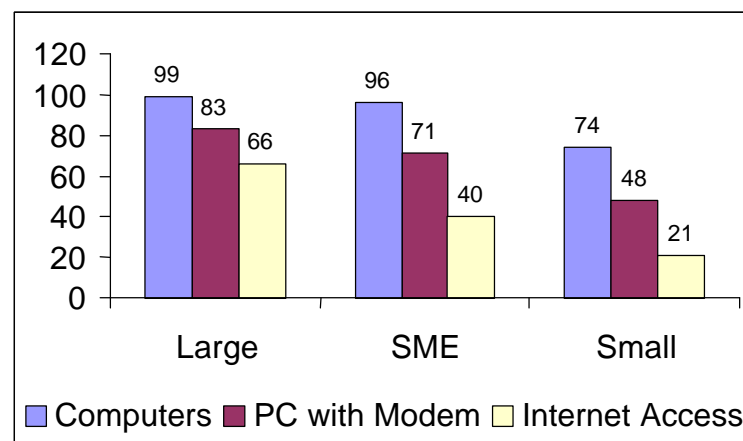
Source: SPECTRUM ICT Survey 1998

Figure 4: Take up of computers, PC with modem and Internet by size of enterprise
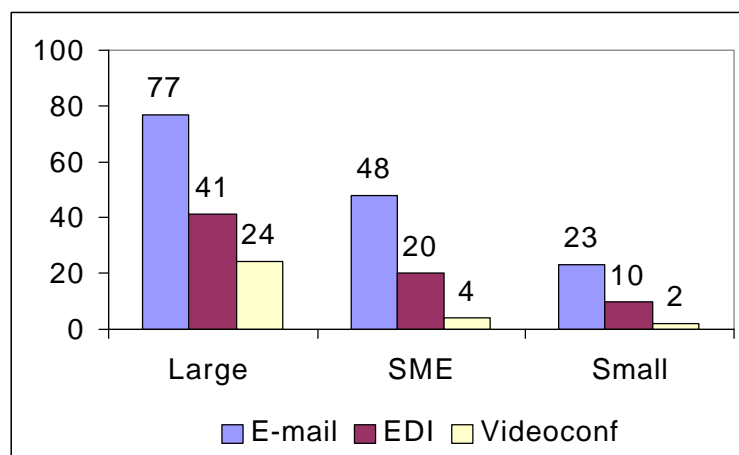
Source: SPECTRUM ICT Survey 1998

Figure 5: Take up of e-mail, EDI and videoconferencing by size of enterprise

Note: in the country-specific sub-sections which follow (3.2 to 3.15), all data are, except where stated, taken from http://www.eto.org.uk/eustats, where other data are also available and detailed sources are given.

3.2   Austria

Summary

After 1997, which was a year of significant progress towards the Information Society with a considerable growth in activity surrounding and following the Government's *Information Society Report* (April 1997), 1998 was a year of consolidation, as far as teleworking development is concerned. Public teleworking activities were continued. Successful pilot projects were carried out by some Provincial Governments. The Federal Minister of Agriculture repeatedly promoted teleworking as a means of improving the employment situation in rural areas. Although, the private sector is only slowly adopting this new way of working, the involvement of more than 350 experts in an Information Society Working Group starting in 1997 means that the underlying principles are having a widespread effect beyond the Federal Government and can be expected to have a

sustained impact in accelerating responses to the Information Society by businesses and citizens, employers and employees and public institutions.

The environment for telework has also advanced considerably in the last two years, with a first collective agreement (in the oil industry), a model contract devised by the White Collar union, and a number of individual agreements within companies. There is however always a gap between public policy and private implementation, and the innate conservatism of Austria's industrial and labour market environments is leading to a rather slow acceptance of teleworking. This may change with lower costs and increasing use of telecommunications following the liberalisation of the telecom market, which came fully come into effect in 1998. Austria's continuing role as a bridge between the European Union and Eastern Europe, where there is much readier acceptance of new methods of work and trade, may also be a driving factor for the spread of teleworking. As we stand on the threshold of a new era during which the EU will open eastwards and the initial Accession Countries will be prepared for full membership, this role will increase even more in the future.

Telework background and take-up of ICTs

General background:
Austria is one of Europe's wealthiest and most stable economies, closely tracking Germany, its largest trading partner, with whom it shares a common language. This relatively large "local language" market also extends to neighbouring Eastern European countries, where German is widely understood. The availability of a large "internal market", together with the relative conservatism of Austria's domestic business markets, perhaps accounts for Austria's relatively low take up of PCs, IT generally and the Internet, compared with (for example) Sweden - a country of similar size in terms of population and GDP:

	Population, millions, 1997	GDP per capita ($ US), 1997	ICT per capita (ECU), 1998	PCs/100 white collars, 1997	Internet users/1000 population, 1997
Austria	8.1	25,445	996	62	45
Sweden	8.9	25,559	1,520	85	148

- Austria has for many years benefited from its geographic position as a bridge between East and West and stands to consolidate this role with the enlargement of the European Union. Many multinational companies choose Austria as a firm base for their Eastern European operations. There may, however, be competitive pressure on this role when some Eastern countries have joined the European Union and may therefore be considered by enterprises to offer a secure base at a lower cost.
- Austria's labour market has strong formalised mechanisms, with national/regional chambers of labour and trade to which employees and employers respectively are required to belong, and which have legally enshrined rights of representation. Paralleling this are Union and Employer federations.

Driving factors:
- The national *Report on the Information Society*, published in April 1997, is providing a powerful blueprint for policy and actions. The report is very broad in scope, addressing the use of technology by Government and industry, telecommunications policy, research and education, and relevant legal and regulatory provisions.
- Telecommunications liberalisation was agreed in 1997 and came fully into effect in 1998 with positive objectives to ensure reliable, high-quality and low-cost services through stimulation of competition and restraint of dominant suppliers. Telecommunication costs are expected to drop further in 1999.
- The social partners (representative of employers and employees), who play a particularly important role in Austria, have started to provide model contracts and guidelines for telework.

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- The Education Ministry is providing free-of-charge Internet access for schools, so that future new entrants to the workforce will be familiar with electronic networking methods.
- Teleworking has become an issue receiving increasing media interest. This public interest may result in increased efforts by employees to make teleworking possible, thus forcing businesses to accept this innovative form of working.

Teleworking in the Upper Austrian Provincial Government

In autumn 1997, the first pilot studies were started with the goal of defining a standard for the implementation of teleworking in the administration of the Upper Austrian Provincial Government. These pilot projects came to an end in autumn 1998 and, as a consequence, teleworking will now be regularly implemented.

The following forms of organising teleworking were tested:
- alternating home based teleworking (1-2 days at home)
- teleworking in a satellite office
- full time home based teleworking

Concerning the field of operation and social circumstances, the following distinctions were made in the pilot:
- general administration: 19 employees in the administration with different tasks and qualifications were chosen to work alternately at home for one day each week and in the office.
- independent administration court, 9 members worked at home for one day each week
- PROTIS, the project "Teleworking in St. Johann und Hanserbergregion": offers the opportunity to telework for 5 technicians of the district administration in Linz. Additional office space was rented for this project. The technicians spend one third of their working time in the satellite office.
- reintegration back in the workplace for two mothers: after several years of maternity leave with part-time arrangements and alternately home-based and office-based teleworking.

Altogether 35 employees of the Upper Austrian Provincial Government took part in the different pilot projects.

The final report about the projects is based upon interviews with the teleworkers, their superiors and their colleagues. The positive experience of the teleworkers and their superiors suggest an extended use of this flexible form of work. The report was the basis for a political decision about the further use of teleworking in the provincial government.

In Upper Austria, these forms of alternating teleworking are being preferred in opposite to isolated home-based teleworking. With the increase of teleworking, the Upper Austrian Provincial Government is positioning itself as a customer and employee-oriented modern organisation which uses the opportunities that ICT offers. These opportunities are especially useful for the government in bringing its services closer to the citizen and in better coordinating the needs of employers and employees.

Constraints:
- Austria's general take-up of Information and Communications Technologies is relatively low for a wealthy and developed economy; this means that Government initiatives and market forces have a substantial backlog to catch up.
- Relatively low unemployment, an economy bolstered by Austria's role in East-West trade, and the conservative effects of Austria's strong labour market institutions are all factors supporting the status quo and providing little motivation for higher investment in ICTs or the introduction of new working practices.
- Initial Union recommendations regarding telework have tended to be prescriptive rather than enabling and have focused on avoiding possible negative effects rather than promoting positive benefits.
- Telecommunications pricing is still high relative to many other European countries. As mentioned,, prices are expected to decrease in 1999 as the effects of the liberalisation of the telecoms market become felt.

Telework activities and results

A number of important activities occurred in 1997-99:
- Austria's first collective agreement for telework was signed, covering the oil industry
- A model contract for telework was created by the white collar Union
- The Union also published a set of recommendations for telework

- The Austrian Labour Market Service (AMS) is supporting a range of training provisions with a focus on IT skills, including projects relating to the use of telework for the increased uptake of women re-entering the labour market and people with disabilities
- In a survey by Spectra, 69% of employed respondents expressed a positive attitude to the idea of teleworking; among younger respondents (aged below 30) the proportion was 77%
- The Federal Ministry of Agriculture supported activities in ETW'97 and ETW´98, consequently putting forward teleworking as a means of improving the employment situation in rural areas.
- High ranking politicians in Provincial Governments (e.g. Tyrol) support local private teleworking activities. One of these is the LEADER Initiative in the Tyrolian Ötztal Valley.
- Provincial and City Administrations are supporting telework activities, including the Provincial Governments of Salzburg and Upper Austria and the Municipality of Vienna. The latter two are carrying out pilot projects in their own administration. In Upper Austria the project has already ended and teleworking is now expected to be implemented as an ordinary means of working
- The Viennese project is successfully underway and a positive outcome, as well as the routine implementation of teleworking, is anticipated by project managers.

Teleworking – a pilot project in the Viennese City Administration

In the spring of 1998, the city administration of the Austrian Federal Capital, Vienna, started a pilot project "Teleworking". After a duration of about two years, the experience with this project will be the basis for deciding whether teleworking can become a routine form of work in administrative institutions in the future.

The project is based on between 40% and 60% of the weekly work time spent on teleworking from home.

Altogether 16 employees, 12 men and 4 women, are currently teleworking. Most of them are from the IT department.

Four participants are in charge of teams or departments, one of them is the superior of another teleworker. Two participants are part-time employees, two others are trying out a desk sharing model.

Initial experiences after almost half of the project's scheduled running time are predominately positive. Although official decisions will only be made after the termination of the project, it can be expected that teleworking will become an ordinary form of working in the Viennese City Administration.

Conclusions

Austria presents unusual characteristics regarding telework. In most countries, demand for and interest in telework has preceded the supply of appropriate infrastructure and social arrangements; Austria appears to reverse this. There has been public support for telecentres; there are model contracts and trade union recommendations for teleworking; the Government is promoting the Information Society. Public institutions run pilot projects on teleworking in their own administration. Still the private sector, dominated by small and medium sized enterprises is rather slow to accept teleworking as a standard form of working, and telework take-up to date has remained small perhaps for this reason. However, there was a much stronger response to European Telework Weeks in 1997 and 1998, and recent opinion surveys show a positive attitude. Furthermore the media interest in the topic can be expected to result in increasing acceptance of teleworking in private businesses.

3.3   **Belgium and Luxembourg**

Summary

Belgium and Luxembourg are small, densely populated countries, with extensive motorway and railway networks. These factors, combined with the concentration of rather small offices in and around the larger cities where they have important economic weight, are not pushing towards teleworking. Nonetheless, the authorities in Belgium are looking at the potential of teleworking to help solve problems of growing road traffic congestion and of high levels of unemployment in old-industrial areas.

Thanks to the telecommunication market deregulation that took effect from 1 January 1998, Belgium is catching up with other comparable countries in Europe in terms of ICT take-up. Indeed, Belgium had the highest growth rate in 1998. The booming numbers of GSM and Internet connections will help public acceptance of - and indeed demand for - new, more flexible ways of organising work.

Since 1994 Belgium has a well-established national telework association (the Belgian Teleworking Association - BTA) with strong representation of major employers, particularly in the IT and telecommunications sectors. The BTA restructured in early 1998 and enhanced its activities.

In Luxembourg, a telework association (Association Luxembourgeoise des Télé-Activités - ALTA) was created at the end of 1998. ALTA and BTA have established close links from the start.

Telework background and take-up of ICTs

General background:
- Relative to its GDP and economic structure, Belgium has a relatively low level of investment and use of ICT.

	Population in millions, 1997	GDP per capita ($ US), 1997	ICT per capita (ECU), 1998	PCs/100 white collars, 1997	Internet users/1000 population, 1997
Belgium	10.3	23,577	1,098	52	54
Netherlands	15.6	22,720	1,233	64	89

- However, Belgium now seems well on the way to catch up with other European countries having comparable economies. Indeed, in 1998,
  - the ICT market progressed by 9.7% over 1997, the highest rate in Europe, following a record growth of 10.3% in 1996-1997; it is now valued at 12 billion Euros; forecast rates for 1999 and 2000 are 9.0% and 7.5% respectively;
  - still, this represented only 5.1% of GDP, just above the European average (but only France and Germany are below Belgium);
  - ICT spend per capita was only 1,026 Euros, less than in the Nordic Countries, the U.K. and the Netherlands;
  - the number of mobile phones doubled in one year, to reach 17% of the population (it was a mere 3% in 1996); a third operator will enter the market in April 1999;
  - the number of Internet hosts grew by 95%; there are now 2 per 100 inhabitants (still low compared to 6% in Denmark, for instance);
  - Internet connections represent 6% of the population.
- Belgium is a long-time leader in the deployment of cable TV networks, with some 95% of TV-equipped households having access by cable to more than 30 TV channels. Cable companies have started offering Internet access at speeds up to 2 Megabits per second, providing an important platform for early trials of broadband services to the home.
- The three Federal Regions (Flanders, Wallonia and Brussels) have installed or are completing the installation of optical fibre backbone networks. In Wallonia for instance, by the year 2001 the WIN network will connect primary and secondary schools (600,000 pupils and 80,00 teachers) through one PC

per 10 students. Other projects target electronic commerce, the integration of handicapped persons, online public information and administration, etc.

- Many public and private sector organisations at all levels have representative offices in or near Brussels, providing a source of employment and local trade, but with a strong perceived need to be "on the spot" rather than working "at a distance". Some 40% of the Brussels population are "non-Belgian".
- A new law on Home Working is in force since March 1997. Although the text doesn't explicitly use the term telework, the government's admitted motivation for passing the law is the anticipated growth of home teleworking.

Driving factors:
- The active telework association (the Belgian Teleworking Association, http://www.bta.be) was restructured during the first half of 1998, stimulating a higher level of activity and membership. Since the end of 1998 there is also the new Luxembourg association (http://www.alta.lu).
- There is a quite high public interest in telework, with a substantial range of activities and events.

EVO-SOFT

EVO-SOFT is an IT centre of competence, the staff of which are 'rented' by clients when needed, for three to twelve-month assignments. The company started with 3 persons in 1997, is now up to 90 is forecasting 220 plus in 2001. It has four small decentralised offices, spread over the Flanders region.

EVO-SOFT employees receive a workstation and communication equipment at home. Every two months they meet together at one of the company offices. The rest of the time they work from home or at the client's premises, at their own pace and as required by the client..

EVO-SOFT has minimal operational costs and passes the benefits of this on to employees in higher salaries. This has become so attractive that the company can easily retain their best staff.

Management claims to have achieved a very positive enterprise spirit and cites as evidence that employees regularly ski together and have formed their own football team.

- Traffic congestion, and regularly visible resultant pollution, in and around Brussels (one million inhabitants and 250,000 daily commuters) provides motivation to reduce the use of cars and unnecessary travel. Incentives for employers taking measures are being discussed in the Parliament, and are expected to include teleworking schemes.
- The Federal Minister of Economic Affairs and Telecommunications initiated Agora'98, a convention of some 300 experts in Information Society matters. He charged them, and also in parallel his Telecommunications Consulting Committee, with producing recommendations concerning 'the transition of Belgium towards the Information Society', including teleworking.
- In the old industrial area of Wallonia, government agencies (ForEm) and educational institutions (Euro-Télétravail) work at re-skilling the workforce into Information Society jobs and include telework with a view to increasing workers' mobility and employability.
- Professional associations such as Fabrimetal, ICT training centres for SMEs such as Teleport Brussels, TechnoFutur3, etc., strongly promote teletrade and telecooperation.
- Belgium is growing as a centre for new telework-based enterprises and operations such as call centres, capitalising on its language skills, its location and its large non-Belgian population.

Constraints:
- The strongly individualistic regions, with different languages and cultures, inhibit people from one region from teleworking for companies in the other, except for the general "pull" of the capital (and third region), Brussels.
- A high proportion of city centre employment is in relatively small representative offices and in small headquarter operations of European federations and associations; the nature of the work and the small scale are not conducive to either intensive ICT use or teleworking. This may change as the use of online methods

becomes more pervasive across directorates of the European Commission and especially if the Commission itself becomes an exemplar of teleworking.

- The motorway and railway networks density, the compactness of the country (30,000 km² for 10 million people), and the easy accessibility of all regions, are delaying interest in teleworking.
- Some surveys indicate that extra costs and perceived difficulties in managing at a distance are still strong inhibitors.

Telework activities and results

- The Belgian Teleworking Association (BTA), founded in 1994, restructured during the first half of 1998, professionalised its administrative and management activities and expanded its membership, which grew from 85 to 110 during 1998. Corporate membership includes household-name non-ICT companies (for example ASLK-CGER Bank, Dow Corning) as well as local and multinational ICT players (Alcatel Bell, Banksys, Belgacom, Ericsson, IBM, Mobistar, SWIFT, etc.), associations such as Fabrimetal (electronic industries) and BelTUG (telecom users group), etc.
- Between March 1998 and March 1999, BTA organised six public events or conferences and co-organised six others. BTA core members gave more than twenty interviews to the media, including two major TV and two major radio channels, and spoke on telework at a dozen non-BTA events.
- Innotek, a Belgian member of the European network of Business Innovation Centres, having opened a single telecentre in 1996, started in early 1998 one of Europe's largest telecentre deployment programmes. On March 15, 1999, they had signed 22 contracts in the Flemish region, and are now continuing in Wallonia.
- Belgacom, in association with the training programme Euro-Télé travail, started marketing product packages labelled Teleworking, including a 'Teleworking PC'. IBM has similar plans.
- The Ministry of the Flemish Region has completed a limited pilot project of home teleworking and started launching a large-scale programme in which dozens of employees may become involved.

WINIT

WINIT supplies IT consultancy, development and services. The company's 15 professionals
- are self-employed
- are partners in a limited-liability cooperative company
- have signed an 'Enterprise Charter' defining the organisation
- sign a specific agreement for each project on which they participate

WINIT has no physical central office at all, it is a virtual organisation based on the company intranet. When partners feel that a traditionally-minded prospective client would expect to be received in an impressive office environment, they rent one by the hour at the local business centre.

According to the company founders, the legal structure and modus operandi of WINIT were designed from the outset to achieve:
- the highest possible level of responsibility and motivation from the partners
- maximum flexibility and efficiency in the organisation
- optimal use of information and communication technologies
- suppression of non strictly necessary charges and overheads

The partners are responsible for equipping themselves with workstations and communication tools (Internet, fax, GSM) in order to be able to work from home.

A formal project management and quality control system is used to ensure production quality.

WINIT customers include large accounts such as AKZO, Belgacom, the European Commission, KPMG, Shell, TD Williamson, etc.

Conclusions

Assuming both ICT market growth, and awareness-raising actions from governmental, professional and associative bodies keep momentum, Belgium will soon catch up with European countries having comparable socio-economic backgrounds.

The majority of the (large and small) 'traditional' organisations are not expected to move to massive (home) teleworking schemes in the near future. They will make more use of technology, however to improve mobility and customer service. They may make use of telecentres in specific situations.

In contrast, many newly forming small enterprises, particularly in the still exploding ITC sector, will adopt flexible organisation models such as those now becoming publicised, and fully use telework, telecooperation and teletrade from the start.

3.4   Denmark

Summary

Denmark is among Europe's highest investors in, and users of, ICTs, PCs and the Internet, but until quite recently telework was not a topic of discussion, let alone action. 1997 saw a complete transformation, with a surge of both interest (in the media, at conferences, by government) and activity, with telework moving from below 1% to between 5% and 15% of the workforce, depending on definitions and survey methods. While there have been many influences at work to bring this about, one stands out in terms of policy: the decision that a computer supplied by an employer for private use at home is not a taxable benefit so long as there is some use for work-related tasks. The fiscal impact of this on Government revenues is marginal; the value in terms of business and consumer attitudes to IT in the home is substantial.

This was an important factor leading to 61% of Danish homes in mid 1999 having their own computer, and 33% having their own direct Internet access. During 1998-99, telework again went out of the headlines, though continued to be taken up in large numbers, after it become integrated in collective agreements between the social partners in the labour market. Instead, e-commerce and other major IS themes began to steal the headlines.

At a more detailed level, Denmark is experiencing the same issues and barriers as in other countries where there is general acceptance of telework: management misunderstanding and lack of confidence, together with a short term focus on terms and conditions and immediate management issues rather than a strategic focus on the transformation of enterprises.

There is, however, no doubt that the implementation of telework in general collective agreements and the growth in employer-provided home PCs give the potential for more flexible working opportunities. There are clear indications that enterprises in sectors most suited to telework, for example in services, information-rich activities and consultancy companies, telework is being employed as a strategic parameter. One major obstacle is still that extensive telework requires a change from rewarding presence towards rewarding performance and this is a sensitive issue within many unions.

Telework background and take-up of ICTs

General background:
▪   Denmark vies with the other Nordic countries and the Netherlands for top position as Europe's most intensive and highly invested use of IT, but until 1996 had relatively low take up of Internet. The situation changed dramatically in 1997-98:

	ICT % of GDP, 1998	ICT per capita (ECU), 1998	PCs/100 white collars, 1997	PCs per 1000 population, 1997	Mobile phones/1000 population, Jan. 1998	Internet users/1000 population, 1997	% growth Internet hosts/1000 population 1996-98
Denmark	5.52%	1,554	68	349	310	134	162%
Sweden	6.49%	1,520	85	353	410	148	70%

| Finland | 5.26% | 1,119 | 63 | 234 | 460 | 146 | 59% |
| Netherlands | 5.93% | 1,233 | 64 | 292 | 130 | 89 | 111% |

- Computer home-ownership is now at 61% (June 1999) with a substantial number having very recently made a purchase, often as part of Government-sponsored scheme that a computer supplied by an employer for private use at home is not a taxable benefit so long as there is some use for work-related tasks. One third of all households now have their own Internet access, a massive four-fold increase since 1997. The total number of people between 16 and 74 years having access to Internet, privately and/or from their workplaces, is estimated to be about 52% (2.7 million people) of all persons in this age range.
- Employment participation is high, as is part time working, while unemployment is low. Employment in services is among Europe's highest levels. Denmark has Europe's highest per capita GDP, other than the exceptional case of Luxembourg:

	Population in millions, 1997	GDP per capita ($), 1997	Labour force participation rate, 1996	Part time working % of employment, 1996	Services as % of total employment, 1996	Unemployment as % of population, May 1998
Denmark	5.1	30,927	80%	22%	69%	4.7%
Germany	82.2	25,363	70&	16%	59%	9.8%
Netherlands	15.6	22,720	71%	37%	73%	4.2%

- High prosperity plus low unemployment mean that skills development, retention of experienced people, and productivity are the key driving factors for industry.

Excel data: Denmark's first satellite office

The IT-services company, Excel A/S, located in the relatively peripheral region of Mid Jutland, Denmark, established the country's first satellite office in 1998, directly building upon the mixed experiences employees have had of teleworking from home. These experiences included both the positive benefits of individual empowerment and reduced stress, especially for employees with families, and the negative consequences of professional and social isolation. The satellite office has been able to counter the latter problems by providing an environment for three employees in which the isolation factor has been considerably reduced. It also spurred the establishment of completely new management techniques for managing at a distance, as well as led to the development of effective on-line communication as part of this process.

Excel Data and its satellite office has already become an exemplar of a way of working which is likely to become mainstream in the near future and contributes in important ways to an understanding of how beneficial teleworking can be implemented to increase social and environment sustainability. The company has reduced employee commuting, saving at least 2,000 km of travel in a typical week, and has shown how peripheral areas can retain and attract well qualified labour. Significantly, the satellite office is the first step towards the geographical decentralisation of employment opportunities within a peripheral area. Social benefits have also been obtained through easing the daily stress of employees with families without increasing isolation, providing a way to reconcile work and private life and opening up individual choice and empowerment.

The effectiveness of the satellite office concept is being monitored by the Occupational Health Clinic of Herning Central Hospital as part of a 30 month evaluation project.

Driving factors:
- Denmark is rapidly entering the Information Society, with high and accelerating investment in ICTs, accelerating Internet take up, a high level of Government and public awareness, and appropriate pressures on industry to become innovative. The number of formal frameworks for and focus on IS developments increased during 1998, for example the public administration's use of IT and digital access for citizens, the establishment of many centres for development of e-commerce etc.
- In terms of skills and competence development, 82,060 people in 1998 took one or more course modules of the European PC Drivers' Licence (EPCDL), out of which 71,232 passed tests. 12,000 persons have

now passed all seven modules. Between 20,000 and 40,000 are currently taking the EPCDL on-line. Another 40,000 are expected to join in 1999. 311 private and public educational institutions are officially appointed test centres, and an advanced top-up course is currently being developed. A growing number of people are also choosing other training courses, for example, about 20,000 licences have been sold for the Wit PC-driving license 97 - a commercial product.

- Trade unions are now largely positive about teleworking, subject to acceptable (to the unions) terms and conditions based on framework agreements, which are in place in most sectors.

- Local and regional authorities continued to take an interest in telework as a contributor to local economic and social development and many initiatives have been launched. For example, there is now much activity on the numerous small islands of the Danish archipelago which are starting to exploit the potential of ICTs to develop teleworking and to improve services. The government launched a telework development exercise (IT-Springet) where 31 public institutions are testing telework in practice (four times as many showed interest in participating). Funding and the intention to cover a broad spectrum of institutes were the discriminators.

- Many have also observed a significant and longer term socio-cultural shift in individual attitudes to society in general and work in particular: telework exemplifies this change - ten years ago it was regarded as something imposed by employers and to be resisted, today its widely regarded as a symptom of greater delegation, flexibility for the person as well as the firm, self-management and self-determination. The emphasis has shifted from a collective focus on rights, equality, hierarchy and bureaucracy to a more personal emphasis on possibilities, alternatives, decentralisation and greater independence. Relatively low unemployment, high levels of participation and a high level of part time working appear to support this change of emphasis.

Constraints:
- The main barrier to progress is lack of understanding and confidence among managers, confirmed by both private and public sector studies. There is too much emphasis on immediate, short term issues and insufficient awareness of strategic opportunities and overall organisational implications. The change from presence-based to performance-based wages may keep some employees from teleworking.

- Public discussion (and apparently most local managerial thinking) is narrowly focused on specifics such as terms and conditions for individual teleworkers working at home, and almost the only model being considered is that of partial home-based teleworking (i.e. part of the week at home, part in the office). This misses the much more significant issues to do with developing the enterprise, its competitiveness and markets, and improving the quality of working life for employees. A second dimension became clearer in 1998, namely that employees were concerned about the prospect of isolation when teleworking or felt the need to constantly be in contact with colleagues and management in order to perform their task or simply keep up to date with workplace developments.

Tax break for company-supplied PCs for use at home

In June 1997, a small change in the Danish tax laws took place which meant that a computer supplied by an employer for private use in an employee's home is no longer subject to tax as long as it is also available to be used for work-related tasks. As a result many, especially larger, organisations and companies initiated schemes in which typically more than 75% of employee households were supplied with a pentium computer, often also including a printer, modem and Internet subscription. In return, employees are in many cases required to take the European PC-driving license course in their own time, which also includes the possibility of distance training arrangements, although the employer pays all charges.

About 35,000 Danish employees took advantage of such schemes during the second half of 1997. In 1998 Denmark experienced a record year for PC sales of 629,167, with the tax break for company-supplied PCs to employees being by far the most important driver according to the international computer marketing analyst company, Dataquest. The tax break has thus become the main factor which has recently pushed Denmark to the top of the world league table for the number of households with a computer at 61% by June 1999, with one third of all households having their own Internet access. (The Danish Statistical Service, 1999).

The tax break scheme has provided a win-win situation for all actors. For employees, the provision of a home PC with Internet subscription has given access to all family members to computing and Internet facilities, and has improved opportunities to reconcile work and private life through teleworking. For employers, the scheme has greatly increased computing skills amongst staff (especially through the PC driving-licence course), and has improved employee flexibility in terms of where, when and how work tasks are performed by making telework opportunities available. It has also opened up the possibility of distance training from work and from home. For the computer and telecoms sectors, sales of equipment and use of the networks have increased substantially. For the government, the marginal loss of tax revenue has been more than offset by significant steps towards their plans for *Digital Denmark*, which aim to equip both the Danish population and the business sector with the technical skills and access necessary to fully exploit the Information Society.

Telework activities and results

An explosion of activity has occurred in Denmark, with far too many interesting developments to report in this summary, which can only select some highlights and aspects of wider interest.

▪ At the national level one of the most interesting initiatives is the so called "IT-springet" (translated as "The IT-leap"), which is a 5.5 million Euros project undertaken by the Ministry of Research. It is the first centrally initiated action in which about 2,000 employees in 31 representative public institutions will participate. Participants are given new PCs and skills courses and activities to strengthen the exploitation of IT are launched in every institution. Awareness rising and experience with teleworking are among the targets of the project. The project is in partial response to the growing demand by citizens for electronic access and information from the public sector which cannot keep up. By May 1999, all Danish ministries and counties and half the district local authorities had a web presence but very few public institutions (such as schools, old people's home, hospitals, etc.) had followed suit.

▪

▪ In 1998-1999 research continues to illustrate the development of telework. However the exact figure is not known, primarily due to the lack of an official definition of 'a teleworker'. In November, 1997 the Danish Trades Union Congress published a survey conducted by Gallup which showed that 15% of employees were already teleworking at home at least one day a week, although many commentators thought this an over-estimate. PLS Consult estimated in mid 1998, that between 10,000 and 50,000 were regular teleworkers. A survey conducted by Aalborg University in early 1999 put the number of persons who worked at home a few days a week and using ICTs at about 250,000.

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▪ If we add to this mobile teleworkers, people who work intensively in inter-organisational teams, in call centres, etc. the number easily reaches 300,000, or about 11.6% of the workforce. It is likely, that the proper integration of telework in collective agreements between the labour market parties will generate data covering regulated telework, whereas a proper indicator for unregulated telework will still be missing. An example of unregulated telework is that most of the Danish municipalities have invested in a so called 'politician's workplace' at home. At the same time, all managers in municipal administrations have been

given home-based fully integrated workplaces as well. The same pattern is found in enterprises, particularly in IT intensive sectors.

▪

▪ A comprehensive survey in early 1999 ("Danske IT-billeder" – Danish IT pictures) by the Ministry of Research shows that the vast majority of Danes see the computer as a working tool rather than for entertainment, and use the Internet to read news and search for professional content. The analysis also shows that there is a real danger that a minority of the population will become a group of information have-nots. The Government is thus confronted with a double challenge: to press ahead with ICT development in the public sector to meet the needs of Danes who wish to access services and information on the net, whilst, at the same time, trying to ensure that those who do not have access to ICTs are not left behind. A parallel survey for the Government Information Service has categorised the Danish population into four groups as far as their relationship to ICTs are concerned:

i)   the enthusiasts: 30% of the population, mainly the young and well educated who use the technology as much for its own sake as for what it can do

ii)   the pragmatists: 26% of the population who are well educated, the majority of whom are women and who positively use the technology to achieve their specific ends

iii)   the traditionalists: 25% of the population who recognise the value of IT but who are worried about technological development. About a quarter of this group are over 60 years old.

iv)   the sceptics: 19% of the population who are against the new technology and are mainly in the older age groups, only 10% being under 30 years old.

▪ An important background study by the Danish Business Development Council found that 20-25% of the 1900 enterprises studied have undergone organisational transformation in recent years, introducing such changes as flatter management structures, self-directed interdisciplinary teams, networking and value-based management styles. These companies were, on average, 30% more productive, developed two to three times as many new products, and created two to three times as many new jobs.

▪

▪ Telework and organisational transformation is being led by larger, more profitable enterprises. Small firms are being much slower to respond, though in some cases the reason may be that smaller enterprises do not see the introduction of teleworking and similar new ways of working as something specific or special and so do not figure so readily in surveys. Teleworking is a positive public relations signal for certain enterprises.

▪

▪ In late 1998, a major conference was staged by about 10 trades unions concerned with the free-lance and self-employed group in order to draw the attention of the government to the difficulties this group face as new ways of working become more prevalent. The problem is that so-called free-agent workers need to be able to adapt to changing market demands, often by shifting status between employee, self-employed and free-lancer. Present legal and administrative frameworks are not geared to such frequent transitions, which means that the individual concerned often ends in a situation where he or she is not able to benefit from the normal level of social security provision. Several politicians participated in the conference and the Minister of Labour undertook to initiate appropriate revisions of the current legislation.

Conclusions

From a slow start, Denmark has rapidly become one of the leading European telework countries. Although telework went out of the headlines to some extent during 1998-99, whilst e-commerce and other major IS themes took over high prominence, it continues to be taken up in large numbers. Increased skills, competence and awareness of telework and other new ways of working are building on previous years' strategic introduction of ICTs into firms, the public sector and into households. The major difference in 1999 is that many major activities have reached a level of maturity and critical mass so that development is now self-reinforcing. Many of the newer ICT skills, for example using new techniques for developing Internet

applications, are being widely taken up, which can be seen from numerous sites on the Internet. Another important development is the widespread use of Internet where the statement: "I found it on the net!" became common in the Danish language. The ratio between the number of .dk internet domains and the population at the beginning of 1999 is 1:10, which indicates a high level of Internet-based activity.

3.5   Finland

Summary

A century ago, the Spanish diplomat Ángel Ganivet in his famous "Cartas Finlandesas" described the Finns' eagerness to take up new technology, such as telephony. Now, the penetration of information and communications technology in both work and home environments is among the highest in the world. This is, no doubt, also driven by the fact that with one of Europe's smallest populations distributed across its fifth largest geographic area, Finland has strong natural motivation towards both conventional and advanced telecommunications applications.

In addition, there are elements in the structure of Finnish industry and culture which make it easy to adapt new technological solutions. One of those is wide occupational competence and independent practices among the whole working force and population. These kind of cultural explanations are especially relevant for telework arrangements, which are often unofficial and usually driven by workers themselves.

There is widespread general acceptance of the use modern technology for making work arrangements more flexible with regards to time as well as place, and Finland is one of the countries in Europe with the highest take-up of telework. People are to a large extent interested enough in new technology in order to use their personal assets to acquire it. In rural communities, too, the attitudes towards telematics are generally quite positive. There is very rapid take-up of Internet and widespread acceptance of uses such as online banking, which is well established in Finland while still a novelty or a future possibility in many other countries. Finland also leads Europe in mobile communications, both as a user and supplier. The Government has proactive Information Society strategies and Finland is very well placed to play a significant role in Information Society developments both in Europe and globally. Authorities tend to see telework as an alternative way to cut down on unemployment through "self-employment", but employers have not been as eager to recruit new people directly as teleworkers.

"Self-employment" is not a legal category in Finland. The authorities are willing to support any kind of employment, including aid to companies and individuals in remote areas, when attempting to boost business activities through telework arrangements. In addition, the government is also willing to support all organisations improve their performance via telework.

Telework background and take-up of ICTs

General background:
- With a small population, spread across a large geographic area, Finland is Europe's most sparsely populated country (see table below).
- Finland's economy has been undergoing a faster transformation than in most European countries since the collapse of Soviet Union, which accounted for up to 20% of Finland's foreign trade. Other factors bringing about change in the early 1990s included technological changes (especially in services), a strong economic boom following by deep recession, a "casino" type of economy and speculation during the boom peak, the collapse of banking sector and its bailing out by public funding, plus a right of centre and agrarian based government.

	Population (millions), 1997	Area ('000 km^2)	Population per km^2, 1997
Austria	78.1	84	93
Belgium/Luxembourg	10.7	31.7	337
Denmark	5.1	43	119
Finland	**5.1**	**338**	**15**
France	58.3	544	107
Germany	82.2	358	230
Greece	10.4	132	79
Ireland	3.6	70	51
Italy	57.2	301	190
Netherlands	15.6	41.5	376
Portugal	10.0	89	112
Spain	39.3	505	78
Sweden	8.9	450	20
UK	58.7	243	242
USA	265.0	9373	28
Japan	124.4	378	329

- The formerly predominantly heavy industry is adapting to the emerging Information Society, and Finland has become a forerunner in many areas of high-tech. Traditional export articles — paper and wood — have already lost their number one status to machinery and new technology (most notably paper machines, ships, mobile phones). There has been a relatively rapid switch to services employment:

	1975 Employment (%)		1996 Employment (%)	
	Agriculture + Industry	Services	Agriculture + Industry	Services
Finland	51	49	36	64
Ireland	54	46	42	58
Netherlands	41	59	27	73

- The rapid growth of high-tech started during the severe depression of 1990-1994. Since then, GNP growth rates of 5-6 % have been experienced. Households have regained their confidence in the economy, and private consumption has risen quickly. However, the recession of the early '90s created exclusion among the unemployed and the young. Social security is still relatively high in international terms, in spite of heavy budget cuts.
- Strenuous national efforts have brought Finland out of a deep recession and unemployment is now falling, though is still uncomfortably high and above the European average. This is despite remarkable economical growth, due to a pool of unwanted low skilled labour, and a shortage of labour in the high tech sector. However, despite the high unemployment, the employment rate is as high as the EU average, mainly because many women are in full-time employment.
- The transformation has included very rapid take up of new telecommunications methods. Finland is among the world's most intensive users of mobile phones and the Internet. The percentage of households with telephone line connections has been on the decline since 1993 and will fall below that of households with mobile phones during 1999. The number of mobile telephones has surpassed that of line-connected ones.

	Mobile phones per 100 inhabitants, January 1998	Internet users per 1000 population, 1997
Finland	46	146
Sweden	41	148
Denmark	31	134
UK	16	119
Germany	12	64

▪ The present economic upswing (or recuperation) has been most visible in the main urban areas which are experiencing an unprecedented population pressure likely to last over the next decade. There are three distinct growth areas: the Helsinki—Turku axis along the south coast, the Helsinki—Tampere axis in southern central Finland, and the coastal town of Oulu in the north. These regions exhibit a strong growth in ICT industry and services, and they all host technical universities and research centres of national importance. In all regions, cities draw people from surrounding areas.

▪ By continental standards, traffic jams are practically non-existent in Finland and therefore not an incentive for telework. The logistical reasons for telework are rather the contrary: distances are large and population density is the lowest in Europe but relatively high traffic costs may encourage telework. The main incentive for telework is the individual wish to improve work performance by organising time and place in an more efficient manner.

▪ 42 % of households have a computer, slightly more than half of which (22 %) are Internet-connected, and in mid 1999 there are over 60 mobile phones per 100 inhabitants.

▪ In Nokia, Finland boasts one of the world's leaders in mobile telephony.

▪ Finland's small population supports two official languages (Finnish and Swedish) as well as widespread knowledge of English.

Summer cottage telework

With a population of 5.2 million, Finland has 350,000 summer cottages. The average distance between a family's normal residence and the summer home is 130 kilometres. Most of the latter are located in the lake district of southern and central Finland, or in the archipelago of the south or south-west.

Between 1980 and 1995, the permanent population of the sparsely populated parts of rural Finland declined from 1.5 to 1 million. During the same period, the number of regular users of summer cottages rose from 1 to 1.7 million. There are several municipalities in which the transitory summer population far exceeds the number of permanent inhabitants. These municipalities now have begun to look at telework as a remedy for their often quite strained local economy.

Summer cottages are increasing equipped for winter as well, and the longer the city dwellers stay in the rural environment, the more they may be expected to spend in local shops, etc., helping to keep the local service structure alive.

The vast majority of summer homes have electricity, many have fixed telephone lines. Most of Finland's territory is reached by GSM, and practically 100% by NMT, the analog Nordic standard of the 1980s now on its way out. (NMT 900 will be decommissioned by the end of the year 2000, however NMT 450 will still be supported). ISDN is available all over Finland, and in some popular cottage areas, for example at ski resorts in Lapland with a large number of cottages owned by organisations and let out to employees or clients, it is not uncommon that ISDN lines have been put in. But in such places, faster connections are already on the wanted list.

Driving factors:

▪ Large distances and a widely scattered population provide a motivation to explore all kinds of telematic applications, so that Finland has been among the pioneers in focused applications such as telemedicine.

▪ The Finnish government is proactive in its attempt to develop an Information Society, and to include telework as part of this (see http://www.sitra.fi/tietoyhteiskunta/index.html). The 1999-2003 cabinet of Prime Minister Paavo Lipponen may put even more focus on IST issues than his 1995-99 one. There is a National Telework Theme Group which aims at coordinating the policy of different ministries and of central organisations. All citizens have free access to the Internet at local public libraries, which means that public on-line services are by nature democratic and not directed to an elite. Still, according to user surveys

only 1% use the Internet principally in the library, which may indicate that those for whom the library is the only access are not aware of its capabilities. IT and telematics training is regarded as a key national priority. For example, basic IT training is provided at all school levels, including elementary school. There are Internet-connected PCs in practically every school. The campaign "Learn the Future of Your Children", aiming at parents and grand-parents, has had some 30,000 participants to date.

- Public acceptance of new communications applications is high: home banking for example is well established and widespread.
- In Finland, the majority of wage-earners use information technology at work. In 1997 there were 121,000 employees and 57,000 entrepreneurs who at least to some extent worked at a computer at home. Of the employees 36,000 had an agreement with their employer. In comparison with previous years, the up-take of telework seems to have started to accelerate. The Ministry of Labour in an other estimate of 1997 counted 220 000 teleworkers (10 % of the workforce), 20 % of whom had a agreement.
- Telework is part of the overall structural changes to the organisation of work. A third of wage-earners are interested in telework. The number of teleworkers is anticipated to increase both in the private and in the public sector, as well as non-typical and flexible work arrangements in general. However, rather few formal contracts have been drawn up concerning permanent telework.
- PSTN coverage is practically 100 %. The old system of area concessions to local telephone companies (the Finnet Group) or Telecom Finland is in the process of deregulation starting 1998. Especially Internet service providers seem eager to compete with telephone operators and against each other.
- ATM is available all over Finland and is widely used by national and municipal authorities and by large enterprises. Also SMEs are to a growing extent taking up ATM. A small number of housing developments have implemented internal networks. All the 3,500 largest enterprises use EDI.

Constraints:
- Finns are to a large extent wage-earners. Small entrepreneurship has not been very positively encouraged, although neither was it discouraged and there are no legislative constraints on entrepreneurs, but a change to more positive encouragement can now be seen. Self-employment is not a legal category of its own – in general the self-employed are classified as entrepreneurs.
- Regarding telework, legislation is not a barrier, but traditional attitudes are, although this is less and less of a problem. Non-typical work arrangements are increasing both in the private and in the public sector.
- In many cases employers are not active in offering telework as such. However, they are interested in flexible working patterns (part-time) if there are capacity problems or cost benefits. Services are increasingly externalised through networking and subcontracting, but not many employers are actively seeking new kind of working patterns as their long-term strategy.

Telework activities and results
- The majority telework activities are taking place in companies and organisations without any public interference or conscious company policy. Telework arrangements are usually partial and aimed at extending the use of working hours and workplace.
- The number of telecentres and telecottages has not been followed up since the early 1990s. During the last seven years, quite a few pilots and projects concerning new forms and organisations outside the traditional working patterns have been set up. Many of them have been part of a public policy to combat growing unemployment, but few of them have so far been economically self-sustaining.
- The promotion of telework has largely focused on regional development in the archipelago and in other rural areas – specifically on creating jobs and training people. There are plenty of projects concerning training for entrepreneurship at most adult education centres around the country. Not many of the formal projects combine new forms of work aiming at lucrative business and growth, but some of them do include e.g. enterprise incubators.

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- Relatively few projects have started as an employee initiative. Most teleworkers have created their place by themselves, usually in professions such as translator, journalist, researcher or programmer. To some extent this group is simply 'compelled' to take up telework.
- From January 1999 the plenary sessions of the Finnish Parliament are on-line at Virhe Kirjanmerkkiä ei ole määritetty[22]. The pages of the Parliament's Committee for the Future host a Futures Report and an interesting comparison of Finland and Wisconsin, the US state most similar to Finland.
- Telematics has brought structural changes and savings in many respects: office work, commuting, trade and banking. Perhaps the effects are most clearly seen in the logistics of commerce and in banking. In Finland, the history of e-banking is long. Wages have been paid directly to bank accounts since the 1960s and Finns are used to paying bills via bank accounts. Payment cards are widely used, and the amount of cash held by the public is low in relation to GDP. The number of private customers' home and telephone banking agreements increased fifteen fold between 1990 and 1996. Home banking is the most used Internet service, but also many customers use older home banking systems via modem. The number of bank offices and bank employees has been halved since the early 1990s and the bank office network is probably the most efficient in Europe in relation to the population. The network of bank automats has surpassed its peak: demounting has begun.
- The Finnish Flexiwork Forum, an NGO, is re-prioritising its activities from being an all-purpose promoter of telework to becoming a teleworkers' association.

Telematic suburb

In Marjala, a new suburb of the Eastern Finnish town of Joensuu, new forms of work are being stimulated together with other forms of everyday telematics. The suburb hosted the annual national Housing Fair of 1995. There is another reason, too, for the Marjala success: tenant democracy has been stimulated starting from the construction phase, creating a better than average atmosphere of belonging and participation amongst the inhabitants.

The area started as a project financed primarily by the City of Joensuu and the European Commission, with the vision of an area where people can live from cradle to grave, where there will be no obstacles to work even among the disabled. City officials have, for their part, tried to lower the visible and invisible barriers between different administrative sectors, creating a better functioning network of public services in the area.

Marjala has a telecottage with free-of-charge use of computers, popular for example for home banking and for contacting municipal social services. Children, too, are encouraged to use the computers of the telecottage. The area now has a local inhabitant as its PC support person, an example of local activity creating local jobs. Also the uptake of telework and flexiwork has been stimulated by connecting the whole area physically into a network. In 1997, Marjala was the location for the first e-shopping experiment in Finland.

The Marjala fair was not the first one to invest in telematics for the inhabitants, but in so doing, it has succeeded far better than its predecessors, probably partly thanks to the ever growing public awareness of the possibilities, and partly to the proactive involvement of the local authorities and their efforts to create grass-roots democracy in the area.

Conclusions

Home based telework for part of the working time, together with mobile and other forms of teleworking is well developed in Finland which is one of the leading European countries in this respect. This is to be expected, given Finland's general leadership in the use of IT and telecommunications. In particular in the Finnish context, mobility at work is well established and growing fast; a majority of the workforce uses mobile phones, Internet use is well adopted, and laptop computers are widely used by professionals and managers.

In Finnish Society, people are traditionally employees with regular monthly incomes. With the technology being there, telework often starts ad-hoc on a small scale, but especially for self-employment, there is little support concerning, for example, how to find a regular job, how to market one's skills and how to find partners and networks. "Self-employed" teleworkers permanently have to balance between the formal status of either employee or entrepreneur, with its consequences for tax, social security, etc. Furthermore, different authorities tend to have different interpretations and answers, although this may be beneficial in terms of

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[22] http://www.eduskunta.fi/

providing flexibility and the ability for individuals to contest decisions which seem to go against their own unique case. The self-employed teleworkers have a strong need for networking and cooperating in the fields of marketing, training and public relations.

However, general support for entrepreneurship does exist, for example, in the policies and operational programmes of the Ministries of Labour, of Education and Culture, and of Industry and Trade. Special efforts related to telework are also included in the national programme of the European Social Fund.

The extent of teleworking can be expected to grow further if the economic and employment recovery is sustained, labour moves from over- to under-supply, employers have to work harder to attract and retain staff, and employees become more confident. The technological infrastructure is in place.

Telework, with teletrade, has an important role in sustaining the more isolated Finnish communities. Success in this will require steps to be taken to widen acceptance and recognition of telework and (especially) of self-employment, for example to provide parity of treatment for employees and self employed, alongside the existing actions to promote entrepreneurship.

The link between telework and teletrade is particularly important in Finland; Finns are natural co-operators and joiners but traditionally to a lesser extent entrepreneurs and marketeers. Given Finland's high profile in mobile telephony and Internet use, the opportunities are there to become a proactive source of new Information Society innovations and services that can be marketed and applied world wide.

3.6   France

Summary

France has made significant progress over the period 1998-1999 in the use of the Internet, ICTs generally and telework in particular. Although the implementation of the 35 hour week regulations is making it difficult for other aspects of *travail nouveau* to gain serious management attention, the very fact that companies are obliged to rethink and in many cases reshape their work organisation can lead them naturally to also rethink the way they work. Governmental action is being very strongly directed to developing the use of the Internet as well as to electronic commerce, for example through the highly successful Fête de l'Internet which became the precursor of the equivalent European Festival organised by the European Commission's Information Society Project Office. The Government is also behind new initiatives focussing on improving the innovation capacity of French enterprise, which may help in going some way to improve France's reputation of not being an entrepreneur-friendly country because of its centralised institutions and often bureaucratic procedures, especially as regards establishing new small businesses.

The national telework association established in 1997 has become more active and is helping to focus the telework debate which is still quite fashionable in the press. The telework potential is immense because more and more individuals are willing to telework in order to improve their quality of life and better balance their professional and personal lives. However, there remain significant barriers to rapid progress. Relative to neighbours in UK, Germany and Benelux, French companies still lack understanding of what telework can bring to the company as advantages that can measured and which do not overcomplicate a system which is administratively already quite complex and getting even more with the 35 hours scheme. There are also some very practical and rational reasons for the slow uptake in corporations: the slow development of intranets and lack of security for many networks. The middle management inhibitor is still a strong one as most of the corporations have not yet moved to process oriented organisations.

Telework background and take-up of ICTs

General background:
- France invests relatively highly in ICTs by European standards, but the pattern of use is distinctly different from that of otherwise similar countries. The pervasive availability of Minitel gave France an early world lead in public awareness and experience of online applications and networking, but has until recently inhibited take up of the Internet and the purchase of PCs by consumers for use in the home. The French Government announced in January 1998 a strongly positive approach to the Information Society. This and other factors lead to expectations of strong future growth in use of PCs and the Internet, but it could take some years for France to catch up.

	ICT % of GDP, 1998	ICT per capita (ECU), 1998	PCs per 1000 population, 1997	Internet users/1000 population, 1997	Households with PCs, 1996
France	5.00%	1,083	234	43	19%
Germany	4.45%	1,064	231	64	21%
UK	6.39%	1,250	283	119	23%

- A somewhat strict interpretation of France's language laws led to a court decision in 1997 that a website based in France but deriving most of its material from an overseas parent site must offer all its material in French as well as in whatever other original language might be appropriate to the company's general audiences and interests. This widely reported judgement reinforced external perceptions that France was not "Internet friendly".
- Persistently high unemployment is the most important item on the labour market agenda and the implementation of the 35 hours working week has been one of the major policies designed to tackle this situation. Clearly, the fact of being legally obliged to rethink work organisation against a time constraint does not help to convince companies to adopt telework. However, there may be positive unexpected results arising from this:
  - companies are obliged to definitely rethink and, in many cases reshape, their work organization which might become an opportunity to start thinking about news ways of working
  - in some cases companies simply decide not to change much internally but instead outsource or subcontract some activities, which could result in an increase of telework or such work being delivered on-line
  - implementing the 35 hours scheme requires in many cases a new look at individual flexibility, and telework might become one of these in order to avoid losing time through commuting. For example, people will work shorter days or be entitled to more holiday days (being taken by half days) and could wish to commute less in order to gain personal time; this could also lead to telecommuting schemes.

  These ideas are very new and not yet implemented, but they should be part of the organisational rethinking when the second law is issued later in 1999.
- France has a large civil service and public sector employing some 5 million people. Acceptance or otherwise of teleworking by administrations and the relevant trades unions will have a particularly significant effect in France.

Driving factors:
- There is rapidly increasing interest in the Internet, particularly as a result of governmental action (http://www.internet.gouv.fr), as well as on the development of electronic commerce where some strong actors (i.e. Paribas Bank, 3 Suisses, etc.) are heavily involved. The Electronic Commerce report issued by the Department of Finance in 1998, and updated in February 1999, is a very well known one in the business world and has led to the creation of an Electronic Commerce Awards Ceremony which took place in March for the Fête de l'Internet.

- A national telework association (Association Française du Télétravail et des Télé-activités - AFTT), established in 1997, has since become very active and is helping to focus the telework debate which is still quite fashionable in the press. Many of these articles are referenced on AFTT's web-site http://www.aftt.net
- Regional authorities are increasingly interested in telework and other Information Society approaches as a way to stimulate local enterprise and employment. There are some pioneer projects in place with more planned.
- A programme for "Modernisation of the State" forms an important part of the Governments Information Society strategy; telework is explicitly mentioned in state modernisation proposals.
- Prolonged high unemployment has increased willingness to try self-employment or to establish new small businesses using or providing ICT methods and services. The Government is acting to support investment in ICTs by small firms and to improve the supply of venture capital.

TELERGOS

TELERGOS was founded in France in 1990 as a teleservices company working mainly in teletyping for insurance companies and claims adjusters. A subsidiary was founded in England in 1994. Initial, production was centre-based, with an head office in Paris and several telecentres in rural areas in the east an southwest of France, and in the north of England. In 1995, total employment was above 100 people with less than 10 working in Paris, and total income was 23 millions Francs. In 1996, because of a rapid decrease in teletyping as the main business, two new businesses were created: conference transcription and back-office outsourcing for insurance companies and brokers.

Today, production is shared between telecentres, home workers and subcontractors in individual or collective organisations. In 1999, 50 % of the 21 millions Francs income comes from these new business areas, and 35 % of activity comes from telecentres.

These experiences have led to a number of conclusions:

1. there is a difference between teleworking and teleservices: teleworking is a production organisation concept, in which the worker works outside the "standard" production place (as company office). A teleworker remains paid by monthly wages as if he works in the company office. A teleservice is an outsourcing concept, in which the billing is based upon the production volume instead of time spent.

2. technology: the new geographical production organisation is directly linked to the capability to digitalise and transfer the information to be processed to the available skill, wherever it is, rather than to transport the skill (the worker) to the information to be processed.

3. financial elements: the change from wages to bills reflects the need to reduce production costs and achieve flexibility through outsourcing. TELERGOS is thus now mainly an outsourcing company working in the teleservices environment because rural telecentres, home workers and subcontractors provide better quality work at cheaper cost. The change from a full telecentre-based organisation to a more flexible one, is due to the need to find high-value skills for variable volumes. The breakeven level decreased from 95 % of income in 1994 to 77 % in 1998.

4. the teleservices market:
- the key is the customer's need to outsource for economic reasons; customers need to be convinced that outsourcing is an efficient solution to their production problems, even if it is difficult to put in place because of psychological questions and trades union reluctance
- a teleservice provider has to be, firstly, a high level professional in the business (e.g. typing, desktop publishing, translation, etc.) and, secondly, possess good ICTs skills and a remote production organisation. The customer often sees the first aspect (service) as positive, but frequently the second one (tele) as a problem complicating the first.
- for industrial products, distance is more a problem than an advantage; it can be solved only by rapid and secure turnaround. A customer chooses a teleservice because the cost and the quality are better, even if distance remains a problem.
- Teleservices cannot be sold as themselves but only as a solution to internal production problems. They need to be sold through outsourcing by a provider which brings a global and flexible solution. Teleservices have to be seen just as other products, with only one difference: distance can be shortened by using the new technology, but all the other parameters remain exactly the same.

There are two kinds of teleservices today:

i)   standard: are well-known services, such as translation, which can be bought from a provider you do not know well if you can easily check the quality of the service. This checking can be supported by brokers who make a selection of translators to measure their quality and reliability. These kinds of services have to be paid contract by contract, with secure payment tools because clients can change after each task.
ii)   customised services: cannot be bought from a provider you do not know because they need a long process of acknowledgement which can be done only by physical links between customer and provider. These kinds of services are mainly recurrent, and provide good returns in commercial investment.

- During 1999, there have been increasing numbers of people trying to find out how to create their own teleservices company in order to become a SOHO or micro enterprise. France is not known as being the most entrepreneurial country and this signal is very encouraging. Technology is giving people the hope that they can succeed if they create their own business. But the process is still heavy and complicated, and it can be expensive to create a company in France, so many still hesitate.

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- The telework potential is immense because more and more individuals are willing to telework in order to improve their quality of life and better balance their professional and personal lives. Telework and the development of teleactivities as a subject is featured in most of the regional or national events related to ICTs.

Constraints:
- From the individual perspective, and given that the employment situation is not very encouraging for taking risks, most people are inhibited from experimenting or asking for benefits like telework which may put their job at risk.
- From a company's point of view, there is still a lack of understanding of what telework can bring to the company as advantages that can measured and they do not wish to further complicate a system which is administratively already quite complex and getting more so with the 35 hours scheme.
- There are also some very practical and rational reasons for the slow uptake in corporations, including the slow development of intranets and the lack of security for many networks.
- The middle management inhibitor is still a strong one as most of the corporations have not yet moved to process oriented organisations.
- With French non-wage costs above the European average, coupled with uncertainties about the impact of the 35 hours week, new forms of online, location-independent enterprises are likely to be deterred from considering France as a primary recruitment source for the new communications-intensive jobs they are creating.

Telework activities and results
- Government at all levels has been heavily involved in the Fête de l'Internet in 1999 with thousands of events reaching more then 3 million people during the week-end of the initiative. All figures are available at http://www.fete-internet.asso.fr/stats-total/
- Results of this have included the opening of about 150 new centres where citizens can access the Internet; the involvement of more than 80 cities and an extension to 13 countries in Africa. The European Fiesta which was organized for the first time this year with the support of the European Commission's ISPO is also a result of the French initiative.
- Another major step taken by the Government during the launch of the Fête de l'Internet by Prime Minister Jospin was the liberalization of 128 bit encryption. France has always been very conservative on this subject, but is now at the same level as the most competitive countries.
- In April 1999, the Department of Finance (http://www.finances.gouv.fr) announced a new set of national indicators resulting from a new measurement system called the "innovation scorecard" which contains 18 new indicators. Amongst these is the number of companies created in the field of ICTs, the number of employees working in ICT businesses, the number of venture capital companies managing funds higher than 15 millions Euros, etc. Unfortunately, telework is not yet part of those new indicators.

▪ A French version of the Teleworking handbook is being prepared jointly by France Telecom and the French Telework Association.

▪ The French Telework Festival was postponed in 1999 but a large event called Telework.com is being prepared for European Telework Week 1999 in the Palais des Congrès in Paris.

Conclusions

In addition to its significance in the overall European economy, France has a profound influence in perceptions and expectations about society and the economy, not only in Europe but also in the wider world, especially in other Francophone countries and in the many regions where France has strong historical, diplomatic and trade connections.

A positive, dynamic and open approach to Information Society applications, including telework, will have wide positive consequences; conversely either a slow response, or local responses that are not widely known about and understood outside France can adversely affect Europe's overall response and Europe's possibilities for a world-leading role in shaping the Information Society.

Events and initiatives in late 1998 and early 1999 have established positive expectations and a considerable heightening of public awareness, but there are many difficulties to be faced and overcome. The nature and extent of follow through in both policy and implementation during the immediate future years will be of great interest both inside and outside France.

3.7　Germany

Summary

The last year has seen important developments in Germany, including a Federal initiative "Telework for SMEs", which has had an significant impact, and the successful foundation of the German Telework Association (Verband Telearbeit Deutschland -VTD). Liberalisation of the German telecommunications sector has also proceeded apace, bringing significant benefits to users, both businesses and households. There have also been other initiatives and activities, many promoted by the government and regional authorities designed to lead Germany more decisively into the Information Society.

However, attitudes towards telework in Germany are still rather mixed. A prolonged period of high unemployment has led to debate about the relative merits of more flexible labour markets as opposed to strengthened labour protection and security arrangements, and the election in 1998 of a Social Democratic led federal government has sharpened this discussion. This has coloured attitudes to telework.

There are also uncertainties about the legislative and regulative environment, which still creates some barriers to progress in the German context. The many useful and interesting telework initiatives in Germany are not sufficiently visible across the rest of Europe; hopefully one effect of a national association will be to make news of German activities more accessible to the wider world.

Telework background and take-up of ICTs

General background:

▪ Germany is Europe's largest economy, one of the world's wealthiest large economies and the world's second largest trading economy:

▪

	% of World Exports		
	Visible trade	Invisible trade	Total
USA	11.95	16.59	13.47
Germany	10.83	7.77	9.82
Japan	8.88	10.93	9.55
France	5.59	9.66	6.92
UK	4.97	9.25	6.37
Italy	4.79	4.19	4.59

The table also shows that among the world's top six trading economies, Germany retains much the highest focus on industry (visible trade) as opposed to services. This is reflected in employment ratios:

	% Share of Total Employment, 1996		
	Services	Industry	Agriculture
Germany	59	38	3
France	70	26	5
UK	71	28	2
Italy	61	32	7
USA	73	24	3

Germany has the highest proportion of people engaged in industrial employment of any European country. This reflects both a success, in sustaining a substantial industrial base, but also a challenge to the extent that the switch to services reflects a general trend among the developed economies and affects preparedness for an Information Society. Indeed, only 62% of Germany's and Europe's economy by value is based on services compared to over 70% in the USA, and new European jobs in the last few years have come almost entirely in the service sector. The world economy is moving more and more towards services which could leave Europe and Germany seriously in arrears, especially in light of the increasing export of manufacturing jobs to low cost economies. The problem is compounded because many services can be made available using the new technologies, and Germany may be losing out on the potential job creation which accompanies this.

▪ Similar factors affect Germany's investment in ICT and therefore its relative preparedness for telework. For example, given its lower GDP the UK has a higher relative investment in ICT and especially in PCs:

	GDP per capita ($US), 1997	ICT per capita (ECU), 1998	PCs/100 white collars, 1997
Germany	25,363	1,064	51
UK	21,952	1,250	57

▪ Unemployment is the main preoccupation of the German labour market, and is still running at 9% (January 1998). An export-led recovery recently was not matched by rapid domestic employment growth. There is on-going debate about whether Germany's historically high investment in social protection and the strong infrastructure of trade unions and works councils is an essential bulwark against unemployment and its consequences or a factor contributing to unemployment through labour market inflexibility and inhibition of new work practices.

Driving factors:

- The liberalisation of the telecommunication market in Germany has already brought significant benefits for users, both business and households. Some telecommunication costs have sunk more then 70% as a result. Work from remote locations and homes will become much more cost effective influencing not only ordinary Internet dial-up, phone calls and faxes but also the way teleworkers connect to corporate offices. As not all enterprise applications can operate using dial-up connections, leased lines allow remote workers to connect to corporate systems.
- The size and wealth of the German economy makes it an attractive target for telecommunications suppliers. Liberalisation can therefore be expected to lead to further extensive competition, driving down prices and introducing new services into an already sophisticated infrastructure.
- The Federal Government has an active Information Society programme, which is accelerating Internet awareness and use and can be expected to stimulate take up of PCs by consumers. Indeed, many activities, including a substantial number promoted by the government and regional authorities, are already implemented and designed to lead Germany more decisively into the Information Society.
- Germany is among the leading countries in legal and regulatory aspects of the Information Society, particularly as regards aspects affecting electronic commerce, such as acceptance of digital signatures.
- Telework offers potential solutions to high unemployment and low levels of economic activity in the Länder of the former East Germany. It could also enable participation in the world-wide growth of ICT and services activities, providing a balance against continued dependence on new investment in manufacturing.

Constraints:

- Although the technological platform for telework and enterprise communication generally has been established, many issues and problems still arise from the organisational point of view. Many decision-makers and managers still do not trust remote work, and those that do have problems understanding how they should support asynchronous distributed work. The mentality of the decision makers does seem to be changing, however, often through the mechanism of workgroups which are an important way for information exchange in Germany.
- There are still many uncertainties about the legislative and regulative environment, which still creates some barriers to progress in the German context. After the 1998 federal elections, the new government has yet to remove some of the regulatory and fiscal uncertainty for small companies, freelancers, and the self-employed. Clear signs from the government are missing in the support needed for enterprise spin-offs, new company formation and investment in new technologies. Current talks between industry and the government may help to solve this problem. Still, there are no general fiscal laws specifically for teleworkers and it will be the task of the associations like VTD and other actors to steer directly towards the necessary changes.
- All German employment practices are strongly linked with contractual, legal and regulatory provision. Widespread adoption of telework requires clear and positive contractual and regulatory provisions, absence of which is a barrier to progress. At present there are uncertainties and anomalies. Concerns about unemployment and/or the potential erosion of employment rights and protections underlie discussion and thinking about telework in Germany.
- The size and underlying strength of the German economy means there has historically been little pressure on German employers or workers and their representatives to look outwards and take note of the changes happening elsewhere. This is, however, changing.

TWIST - Innovative Teleworking at BMW

Multiple forms of teleworking are supported in this large project implemented at the German car producer BMW. Multi-site telework (alternate telework) has been set up with shared workplaces between BMW premises and employees' home offices or satellite offices. Each workplace is linked on-line via ISDN or via the D1, D2 Network. Highly qualified employees, for example in the research and development areas, have been given the chance to work from remote locations and from home.

After the signing of a BMW Group Agreement Paper on telework in December 1998, telework has been established as a modern form of process reorganisation as part of a mutual agreement between management and employee

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representatives.

The aims of "TWIST-Teleworking in Flexible Structures" project are to evaluate the positive and negative effects of teleworking on BMW AG regarding individual, organisational and social aspects. The study focuses mainly on the identification of obstacles to implementing telework as well as on the evaluation of possible promotion effects.

A complex cost-benefit analysis system is being used in which, not only economic assessment factors are taken into account, but also psychological, socio-economic and social criteria. The evaluation of the cost-benefit analysis has already had a major impact on the diffusion of telework both within the BMW AG as well as outside the company

Telework Activities & Results:

- A recent Federal initiative "Telework for SME's" (TIM - Initiative Telearbeit fuer den Mittelstand) has had significant impact. More then 400 small and medium sized enterprises have been established providing more then 1,700 telework places, in which more then 500 are totally new.

- The VTD - Verband Telearbeit Deutschland (The German Telework Association) was successfully founded in 1998. The VTD, supported by and embedded in the activities of ETD, supports companies and teleworkers in their implementation of telework. Members can profit from project archives and a knowledge base with valuable and confidential project information. The VTD is also collaborating with other associations to define a framework for telework, and in advising the Government in its decisions affecting telework and new ways of working.

- The OnForTe project is supported by several German trades unions, the Federal Ministry of Education, Science and Technology and Deutsche Telekom. OnForTe provides advice and support, examples of "best practice", information for self-employed people, examples of collective agreements on telework, information about health and data protection, and links to experts. The OnForTe initiative has also been awarded the German "Integration Prize" for being an outstanding example for telework and information integration.

- A workgroup with members from several European Commission ADAPT projects has been established. The goal is to bring together the results of various projects and to give new projects the chance to learn from their experience. One important aspect is to analyse failures and mistakes in order to prevent newcomers from making similar errors.

- The TWIST (Teleworking in Flexible Structures) project has industry partners BMW AG (performer), Siemens Nixdorf AG (technical support), Tally GmbH Equipment (printers), and BPU GmbH (project research). These are working together to implement 300 teleworker places in order to improve work flow and to strengthen the long-term competitiveness of BMW AG.

- The initiative "Secure Teleworking in Communal Administrations" ("Datensichere Telearbeit in kommunalen Verwaltungen") has been launched by the German Federal Ministry of Economics and Technology to stimulate local public authority administrations in establishing real telework places. The project is the direct follow-up to the very successful federal initiative "TIM - Telework for SME's" (mentioned above). Only 3% of all cities presently have employees using telework and only 27% of them plan to do so. One goal is, therefore, to use telework to establish call centres in order to increase the performance of public services, and an important task is to maintain appropriate security while sending confidential documents over, for example, the Internet.

- The Internet Telework Job Exchange project is a pilot for an agency seeking to bring together job seekers with job providers without charge where there is a telework focus. The service will only be available electronically, and will also help to define appropriate workpackages and contracts, aiming to make the telework market in Germany more transparent.

Conclusions

Germany's significance as the largest European economy means that its response to applications such as telework will have a wide influence on Europe's overall response. Much activity is taking place in 1998-99 which clearly demonstrates the Federal Government's active involvement in supporting telework and related legal and regulatory matters, and there is also evidence of increasing interest among companies, unions and citizens, as well as by the Länder administrations. The successful formation of a national telework association in 1998 has already played an important role in further stimulating public interest and ensuring informed debate. The number of projects and activities on teleworking is increasing fast. There is a need to bring these different initiatives and groups together, perhaps as a META-group, in order to reduce the search time for information requests and to decrease the redundancy of existing knowledge bases. An important task for associations like the VTD is to co-ordinate activities and give the Government appropriate input to build the right framework for new ways of working.

Germany presents one of Europe's clearest examples of the dilemma between protection of established worker rights and labour market practices on the one hand and the need for more flexible organisational and working practices on the other. Telework is only one aspect of this issue but the debate on telework puts the issue into clear focus and how it is resolved in Germany will be important for Europe as a whole.

3.8   Greece

Summary

For Greece, with the European Union's highest level of employment in agriculture, next lowest per capita GDP after Portugal and lowest proportion of information workers, the Information Society clearly has different aspects and implications than it does in (for example) Denmark or Germany. With workers in the service sector making up only 55% of the workforce, Europe's lowest, telework in the most commonly accepted sense (working at or near home instead of commuting to an office) is not a high priority. On the other hand, cross-border teleworking and closely related applications such as teletrade and telecooperation present excellent opportunities for Greece to widen its basis of trade with the rest of Europe and internationally.

Even though Greece is one of the European countries with the lowest levels of investment in ICTs, 1998-99 has seen significant steps towards the development of a framework supporting teleworking, partially driven by Year 2000 problems. Much effort has been put towards increasing the availability of PCs and Internet access, in order to:
- promote the idea of teleworking,
- accelerate public awareness
- spread use and experience of information technology and online activities.

Telework background and take-up of ICTs

General background:
- In Greece, the level of investment in ICTs is proportionately low within Western Europe, particularly in relation to Internet usage.

	ICTs as % of GDP, 1998	ICT investment per capita (ECU) , 1998	Internet users per 1000 population, 1997
Greece	4.42%	452	11
Portugal	4.92%	477	19
Western Europe	4.98%	1,020	54
Western Europe highest country	6.49%	2,023	152

- However, growth in many aspects of the Information Society has been rapid over the last one to two years, albeit starting from a very low base. In early 1999, the number of PCs with a permanent link to the Internet

was approximately 27,000, whilst the number of people who have access to the Internet is more than 100,000. The projection for 1999 as a whole is optimistic for further rapid increases and much higher than average growth compared to Europe as a whole.

- The estimated number of teleworkers using the broad definition has likewise increased rapidly over the last year, up from about 0.5% to about 1.3% of the workforce, representing an increase of approximately 160% compared to the EU average of about 45%.
- The market for IT in Greece is becoming very promising due to major IT projects financed by the public sector. During the period 1997-98 the development rate of the market reached 17.2% and over the next two-year period it is expected to be more than 18%.
- Agriculture remains a significant source of employment in Greece. Employment in services is the lowest in Europe and includes a high public sector and a large element of tourism. Greece has Europe's highest proportion of employment in small firms and self-employment, and lowest proportion of information workers. This reflects the prominent roles of tourism and agriculture. Other than in small firms the public sector, directly and indirectly, is a major employer and a dominant influence on employment practices.

	% of employment, 1996		Enterprises per 1000 population, 1992	% of total employment		
	Agriculture	Services		SMEs 1992	Self employed 1995	Information workers*
Greece	21	55	101	86	34	22
Portugal	12	56	64	78	26	33
EU lowest/highest	2	73	23	56	8	54
Jala International, quoted in EITO 1998						

- With low per capita incomes and spending power, the cost of a PC or an Internet connection appears high to the Greek citizen or small business owner - more than twice as much as for an equivalent person in USA, nearly twice as much as in Denmark.

Driving factors:
- There is a rapidly increasing level of World Wide Web activity, with a particularly strong emphasis on using the Internet for telecooperation. According to a recent survey performed by *Amer Nielsen Research and Creative Marketing* companies, it is estimated that approximately 125,000 Greek citizens surf over the Internet on a regular basis. However, only 50,000 user accounts are registered at the Greek Internet providers. The reason for the apparent discrepancy is because the Internet is accessible from universities, public information points, libraries and enterprises.
- The number of Internet providers (Internet connections are offered by 40 companies in Greece) has increased during the last couple of years due to the increase of demand.
- The price policies of the Internet providers are relatively affordable and vary from 20 to 40 Euros per month.
- Since April 1997, there has been a special committee for the introduction and motivation of public sector and government bodies to use information society technology in all their activities. An example is a major project called *Integrated Information Systems for Taxation (TAXIS)*, already used by Tax Offices around Greece.
- After approval from the Greek Parliament of the new law 2639/98 in mid 1998, a new era of teleworking has appeared in Greece. This law introduces teleworking and presents it officially as an alternative type of work, as well as setting a legal framework describing the obligations and rights for both employees and employers.
- During 1999, a big campaign is underway in Greece to increase public awareness of the need for information technologies, and to present teleworking as an alternative means of work. The campaign is based on articles in newspapers, special magazines, TV commercials and presentations, conventions, etc.

- The Greek Telecommunications Organisation (OTE) has launched an extensive network modernisation to meet the increasing demand of its national and multinational customers.

CRO - "Crete Resort Offices"

CRO is the first Resort Office prototype in Europe. Located at the Hotel Candia Maris, Heraklion, Crete and at the Telework Business Centre of STEP-C (Science and Technology Park of Crete), teleworking facilities for businessmen and tourists in a resort environment with a business centre have been set up. They provide full secretarial and technical support for teleworkers, with optional accommodation in a nearby hotel where guests can also take advantage of teleworking facilities offered by some of the major Hotel chains on the island of Crete.

The vision of blending teleworking with tourism and high quality of life has been given shape in the new concept of Resort Offices. Flexible working arrangements are promoting business and high technology breaks in traditional holiday locations. Teleworking is an obvious example. For the individual, this represents a challenging new life-style and a new means of empowerment. For companies it can provide increased flexibility for top employees as well as for valued clients and partners.

Resort Offices represent more than a new business opportunity and a re-organisation process. They introduce an integrated concept for work and relaxation in an environment that promotes creativity, encourages commitment to new technologies and offers ample opportunities for all year round enjoyment.

The main potential users of this new working option are:
- tourists who need to perform some work during their holiday period.
- foreign citizens who are planning to establish their permanent or temporary residence in Crete whilst retaining their employers and/or clients abroad.
- professionals that come to the region of Crete to attend conferences, meetings, etc.
- any other business individual.

Constraints:
- Telecommunications liberalisation, in the field of services, has been postponed in Greece until January 2001.
- The quality of existing telecommunications infrastructure and services, and the technical infrastructure of Internet providers is still limited, due to the fact that demand is increasing and network modernisation programmes have only recently been launched.
- Despite the campaigns and initiatives mentioned above, there is still general lack of information concerning teleworking.
- A conservative attitude pervades employers when it comes to promoting telework.
- There is a low level of computer education and a lack of expertise in information technologies, particularly for workers who are aged 40 years and over.

Telework activities and results

- Some new countrywide initiatives are in progress like the GOSHOP.GR, which is a joint venture of firms trying to sell many different products via the Internet. Another good initiative is the GOGREECE.COM, that provides a subscription form for everyone who is interested in selling products. Recently, a leading Greek supermarket firm has made it possible to purchase goods through the Internet.
- In January 1999, a special workshop was organised by the Federation of Hellenic Information Technology Enterprises (FHITE) with the title *Teleworking in Greece* and the aim of presenting and promoting teleworking in Greece. For first time at such an event, the main speakers were the Minister of Labour, the Minister of Telecommunications, experts in teleworking and others.
- Several telecottages have been established to motivate entrepreneurs to invest in information technologies. An example is the telecottage in Crete, housing teleconference equipment, Internet access and ISDN lines and which targets the high level of tourists (executives, managers) who wish to work during their vacations.
- Concerning Electronic Data Interchange (EDI) techniques, there are several on going projects to promote data interchange, trade through the Internet, and other e-commerce applications.

- The Greek Tax Office has implemented an on line system, called TAXIS linking all the tax offices around Greece with a main data server and special applications. Using the TAXIS system and with Internet access, it is possible to send VAT and other forms on line.
- An increasingly number of Greek Private Banks (e.g. Eurobank, Alpha Bank and Egnatia Bank) are offering a new service to their customers through the Internet. This gives access to selected customers through codes and PIN numbers to make bank transactions, queries on bank accounts, etc., from anywhere in the world.

The "Kassopi" Telework Server

This is one of the three applications in the TEMeTeN project (co-founded by the EU and the GGRE), and is itself composed of two parts: tourism and telework. The design and the structure of the information on the "Kassopi" Telework Server is aimed at non-expert users of computers; in fact the user needs only to be familiar with the use of an Internet browser. Thus the software package created is easy to understand and easy to use. The Web pages of the "Kassopi" Telework Server have a similar structure, with a user friendly interface so that the user will know what to expect at any given Web page. To make it even easier for the user, Virtual Reality pages have been incorporated for the tourism part of the application. The "Kassopi" Telework Server also has an option that takes the user to the common Web page of all the participants of the TEMeTeN project (the Balearic Islands of Spain, Crete Greece, and Epirus Greece).

Virtual Reality pages are used for the tourism part of the web-site which take the user to a different environment, in order to increase the users' interest to use the Web server for planning a vacation at Epirus. The user has the choice of two languages, English and Greek. Later there will be the addition of one or more languages (German, French etc). Other features are the ability to search for accommodation or a travel agency, with electronic booking and payment.

The "Kassopi" Telework Server is at the following URL: http://medlab.cs.uoi.gr/server/epirusenglish.htm.
The telework pages have the following characteristics and features:
- a map of Epirus
- a menu with telework sites in Epirus
- an option to go to the useful information page which contains information of value to mobile teleworkers
- information concerning the billing policies of the telecentres
- information about telework sites in Epirus grouped into three categories: the Telework Corners, the Telework Centrres and the Internet cafes.

Telework Corners are small Telework Centres where ICT resources are offered to the users in order to telework. The Corners provide commonly used software, such as word processing, database tools and other facilities such as printing, fax and Internet access. The Corners have been set-up in two hotels, one in the prefecture of Ioannina and one in the prefecture of Thesprotia. These two prefectures have the largest number of visitors during the full year, especially the prefecture of Ioannina, which is an ideal place for winter vacations.

Conclusions

The increasing demand of modern society for the efficient and fast exchange of information has presented telework as a very useful additional form of employment, i.e. working at or near home instead of commuting. However, the potential investments in Greece of the necessary technologies and other facilities are far from adequate, making the take-up of telework relatively difficult. In addition, there is a need to accelerate public awareness of teleworking and to promote the use of information technologies and online activities. For Greece, the legal and technical infrastructure is already being developed making the future quite promising in this respect. More important, however, is the need to invest in rapidly increasing PC and Internet access which will be decisive in shaping Greek participation in the global Information Society.

3.9   Ireland

Summary

1998 saw the "mainstreaming" of teleworking in Ireland, with changes in the political and regulatory situation and improved awareness of teleworking as a work option. These developments occurred against continuing economic growth and increased employment accompanied by worsening skill shortages, rapidly increasing

property prices and severe traffic congestion in major cities. Unemployment in Ireland is now below the EU average at 6.4%, with record annual net immigration figures of 22,500 people.

IT market value growth for Ireland is predicted at 10.9% for 1988/99 by EITO, the second highest in Europe. A survey by Amarach Consultants indicates cost is a limiting factor for the spread of ICTs - 68% of Irish people do not have access to a computer at work or at home. Of these, 90% do not intend to buy one within the next six months, either due to high prices or inability to afford a computer. A 1998 survey for the Information Society Commission indicated over half of Irish people believe they are unprepared to take advantage of new ICTs. These figures indicate the beginnings of a societal split into information "haves" and "have nots".

The telecommunications market was deregulated one year ahead of schedule at the end of 1998. Twenty-eight telecoms licences have been awarded to operators. Telecom É ireann, the former state telco, was privatised in a public share offering at the end of June 1999.

Telework background and uptake of ICTs

General background:
According to a 1998 Information Society Commission survey, 75% of Irish businesses are now connected to the Internet - a higher percentage than in the UK, France, Germany, Japan, and the USA. The majority of "early adopters" reside on the eastern (Dublin) side of country. An Amarach Consultants survey in June 1999 estimates about 15% of the adult population is now connected to the Internet. About 7% of the population access the net from home compared to about 5% accessing from work. However, PC usage only increased from 20% in 1996 to 22% in 1998 though access to PCs rose from 21% to 28%.

An internal trial of ADSL technology for teleworking is under way in Telecom É ireann and a high-speed ADSL Internet access trial is also likely to form part of a joint scheme between Microsoft and Telecom to test out broadband technology suitable for teleworkers. In the cable market, the largest operator CableLink has been bought by Northern Ireland operator NTL and intends to use its network to provide broadband to the home.

Ireland has some 11,000 people working in the call centre industry according to Industrial Development Authority (IDA) figures. Skill shortages affect this sector - around 36% of those working in multilingual call centres are foreign nationals, mainly due to shortages of German speakers. There has been some progress in locating call centre projects outside Dublin, but most developments have been in other large cities such as Cork and Limerick, rather than in smaller towns. IDA policy is focussed on investing in high-level work, including services which integrate e-commerce and web interfaces. There is a strong move towards "shared services" projects which handle administration as well as calls. Press articles continue to highlight problems with working conditions and "burnout" for some call centre operatives. Weekly wages in the industry for single language operatives are only £10 pw more than for agricultural workers. The Minister for Enterprise, Trade and Employment has launched an information campaign for schools aimed at improving the industry's image. She states starting salaries in the sector are now £IR10k-£IR14k.

Unfortunately, the Central Statistical Office, which converted its enumerators to teleworkers at the end of 1997, using laptops to carry out surveys in people's homes, encountered major change management problems leading to a number of non-vital statistics, such as figures on homeworkers, not being collected during 1998. For the second year in succession the Information Society Commission has called on the CSO to remedy the lack of teleworker statistics.

3-Com Ireland

Jim McGovern is Sales Manager of 3-Com Ireland, which specialises in supplying networking solutions. He uses teleworking to be in touch with his customers as much as possible.

Starting from home he logs in to the office at about 8 in the morning and spends a couple of hours dealing with

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communications and administrative tasks. Then he heads off to meet customers without the accompaniment of Dublin's rush hour traffic. McGovern only keeps a "footprint" at the 3-com plant, working mainly from home using an ISDN line. He has been teleworking for over 6 years and spends 85% of his time away from the office, along with an estimated 90% of his colleagues in 3-Com's sales office.

He believes that being a teleworker has never been easier due to technological advances like email and ISDN but warns that teleworking can also be disorientating and isolating without human interaction, leading to drops in standards due to lack of stimulation. Self discipline is vital for teleworkers and the situation at home for teleworking must be suitable - no toddlers or building work in the background! (Business & Finance 29/1/98, Business Contact August 1998)

Two smaller privately commissioned surveys looking at teleworking were carried out with conflicting results. A survey by the Dublin Transportation Office, Telecom É ireann and Telework Ireland indicated in summer 1998 that 7.6% of Dublin workers occasionally worked from home using a computer, while 52% would like to mix some homeworking with their office work. This survey also found that employers believe around 15% of their employees are suitable to work from home and that the biggest group of prospective teleworkers are the self employed, where 37% of workers are involved on some form of homeworking.
A survey carried out by the Work Research Centre for the Teleman ADAPT project over the same period indicates only 0.3% of employees of large companies (with over 1000 employees) are teleworking and overall only 4.3% of the companies surveyed use teleworking. A separate survey of members of the Institute of Personnel and Development (March 1998) indicated around 15% facilitating staff members who wish to work from home, in close agreement with the DTO/TÉ /TWI study.

For the second year running, the greatest effect on increased awareness of teleworking in Ireland has resulted from the actions of Telecom É ireann including radio adverts during European teleworking week, a video clip for use at the Communications 99 exhibition, distribution of 20,000 teleworking brochures, a major poster and radio campaign in May/June 99, support for the "Shortest Route" survey, creation of a teleworking freefone helpdesk and business breakfasts on flexible working for corporates.

The Information Society Commission has published a plan committing the Irish government to various actions. Those likely to affect the uptake of teleworking include:
▪   completion of agreement with international carrier for international broadband connectivity (by second quarter 1999)
▪   allocation of £18m EU structural funds to national broadband connectivity
▪   introduction of unbundled local loop and provision of wireless local loop as quickly as possible
▪   opening of the first digital park close to Dublin to be followed by another in Dublin docklands
▪   actions to encourage e-commerce business and employment opportunities including promotion of entrepreneurial culture, reductions in ISP charges and establishment of a digital certification authority
▪   PCs, ISDN connections and internet access in every public library plus examination of feasibility of Internet kiosks in schools, post offices etc as well as of email addresses for all citizens.

One political development has been highly unfavourable to teleworking. The 1998 Finance Act failed to include widely-predicted measures to provide tax breaks for childcare. Ireland remains one of the few European countries to financially handicap parents of young children who wish to work. The omission occurs at a time of skill shortage when female participation in the workforce, still the lowest in the EU, has been rising. Irish parents pay up to 20% of their income in childcare, one of the worst figures in Europe.
The government's National Advisory Committee on Teleworking reported in June 1999. The main recommendations of the NACT are:
▪   A government awareness campaign
▪   Formation of a government teleworking policy with government becoming a leader in teleworking implementation
▪   Implementation of "telework friendly" training and education initiatives particularly awareness of existing initiatives

- Formation of a teleworking action forum to monitor, evaluate, initiate and support teleworking initiatives
- Establishment of new business models
- Fiscal and legal changes to make Ireland telework friendly
- Telecommunications environment that facilitates teleworking

The Minister for Science, Technology and Commerce Noel Treacy, said implementation by the social partners of a code of practice on teleworking included in the report, drawn up in consultation with the employers association IBEC and the congress of trade unions ICTU, would be a great help to persons or organisations considering the adoption of teleworking. "In my opinion, one of the most important elements of the report is the Code of Practice". The code was drafted by ETD Ireland for the National Advisory Council on Teleworking.

Oniva

Daragh Scaife is Chief Technical Officer of Oniva, a Dublin-based company that produces Internet, Intranet and multimedia work for clients in Ireland and Britain.

Daragh uses a laptop and mobile to connect to the office network, as well as a palmtop and mobile for picking up messages while travelling. Recently he was making a sales presentation in Britain to a group of people who had gathered at one location for an afternoon meeting, and planned to make a decision on awarding their contract the next morning. After the meeting, at which people who had not attended the original briefing were present, he felt the looks on people's faces weren't right and there was some element missing from his presentation. He got agreement to represent the next morning at 9.00 before the decision meeting. Overnight he faxed a new design idea to Dublin, and then collected the new presentation files using his laptop and GSM working from a hotel. He made his second presentation the next morning and was able to secure the contract.

"Flexible working means geography is not a problem - we have also used email links when staff members we want to retain get the travelling bug. Currently we have a 3-D designer working for us from Spain, and a software developer located in South Africa. Overall, the most important aspect of flexible working is the higher productivity that's possible in collaborative work by exchanging files and messages over any distance". (Telecom Eireann Flexible Working Business Breakfast 3/3/99)

Ireland has become the second country to ratify the International Labour Organisation's Convention on Homeworking which gives homeworkers (including teleworkers) the same rights as other workers. These rights included maternity leave, sick leave, holiday pay, minimum notice if they are let go and the right to take their employer to the Employment Appeals Tribunal if they feel they have been sacked unfairly. If they lose their jobs they are entitled to social welfare, and the government must promote equality of treatment between homeworkers and other wage earners in areas such as the right to organise, training, and fringe benefits. These rights will come into force on April 22nd 2000.

Other important developments include:
- Completion of an employee share ownership scheme to allow Telecom É ireann workers to purchase 15% of the company, triggering a widespread agreement on reorganisation and improved efficiency including a company-wide teleworking agreement.
- Report of a committee of international experts which set out a clear plan of actions required for Ireland to become a European hub for electronic commerce
- Campaign to reduce Internet access charges, including obtaining European Commission approval for flat rate Internet charges.

Driving factors:
- IT skills shortages
- Increased percentage of women in the workforce
- Government policy encouraging ecommerce, improved infrastructure.
- Awareness actions by Telecom É ireann
- Enterprise Ireland/IDA priority provision of jobs outside the Dublin area resulting in financial incentives

- Spread of affordable Internet access
- Traffic congestion especially in Dublin
- Actions of EU programmes and funding e.g. ADAPT, ETD, Diplomat, Area Partnerships, LEADER, County Enterprise Boards, ESF training grants
- Telecommunications deregulation and increased competition
- Increased available training

Constraints:
- High telecommunications interconnect rates and lack of transparency in rates limiting competition.
- Management culture resisting changed methods eg management by results
- Perceived lack of broadband infrastructure
- Legal confusion: employment v. self employment, planning permission, taxation, health and safety
- Few/inappropriate training resources available especially for adult returners/retrainers
- Insufficient support structure for telebusinesses in rural areas e.g. technical support, access to computer maintenance, adequate training facilities.
- lack of awareness of teleworking option in recruitment agencies

Telework activities and results
- CWU Disability and Teleworking conference - 86 people attended a conference organised with ETD on 5/11/98. The conference discussion concluded teleworking offers opportunities for employment of disabled people, but there are problems of isolation, while current IT training is too low-level for many teleworking tasks. Access to information on opportunities and adaptations to equipment is insufficient.
- East Clare Training Associates held a conference in Ennis during European Teleworking Week on its Localnet project (local telematics networks for training and development) sponsored under the Leonardo programme.
- Emerge Consultancy has been running a programme under the Adapt programme for SMEs with 50 to 100 employees and is working with two companies interested in implementing flexible working to design tools and techniques for managers.
- ETD and Telecom have collected news clippings on teleworking and related sectors such as ecommerce for the past year. Abstracts are available on the CWU website www.cwu.ie. Telecom and ETD worked with the Tech TV series on RTE 2 to prepare a special feature on teleworking for European Teleworking Week. Telecom has also sponsored the ETD freefone helpline on teleworking.
- ETD is working with several websites advertising Irish jobs to add information about teleworking options and to encourage recruiters to indicate jobs which are suitable for teleworking. (www.jobfinder.ie, www.exp.ie, www.marlborough.ie, www.premier.cc)
- FÁS state training agency and Telework Ireland, an association for teleworkers, are running a distance learning course for teleworkers delivered over the Internet with support from Postgem, parent company of ISP Ireland Online - 100 people have been enrolled to be trained as software localisation test engineers.
- South Kerry Development Partnership held seminars on teleworking opportunities addressed by Sheila McCaffrey of the KITE telecottage and followed up by the appointment of a development officer tasked to encourage Dublin professional teleworkers to move to rural Kerry.
- Telecom received 3190 calls to its teleworking freefone helpline service in the year to January 99. Research with corporate customers indicates flexible working is rated as their second most important business issue, and a business breakfast on flexible working issues for major customers received an attendance of 250 executives. Telecom has over 500 staff teleworking informally.
- Telework Ireland held its conference in November 1998 at Portumna, Galway entitled "Teletrade - the new goldrush?". There were 80 attendees and the conference was addressed by the Minister for science, commerce and technology, Maarten Botterman of the Commission and Kevin Sweeney of Hewlett Packard, where 30% of sales and support staff telework.

- The Work Research Centre has run an Adapt programme, Teleman which surveyed teleworking practices in large companies (with over 100 employees). The project has consulted with HR managers and created an advisory forum MAST (Managers Supporting Telework) for companies implementing teleworking.

Conclusions

Overall, skill shortages and problems with management culture, rather than lack of technology or infrastructure or cost of telecommunications, are currently the limiting factors to teleworking in Ireland. Therefore the crucial area for future action is training of managers, particularly HR managers.

The proportion of homeworkers who are self employed (just over one third) follows trends in Britain and the US. However, lack of social protection and appropriate training resources aimed at the self employed in Ireland will limit growth of teleworking self employment. Formation of "virtual companies" of associated self employed teleworkers is limited by legislative confusion particularly about tax and employment status.

There is a strong requirement for government to lead the private sector through action to introduce teleworking and e-commerce into public administration where there is little activity to date. Political action, to provide better childcare facilities, and to provide financial support for childcare provision is urgently needed to assist people with parenting responsibilities, who also tend to be receptive to teleworking.

There is great enthusiasm for the potential of teleworking amongst rural development activists but few commercially successful projects are in place and much existing training provision is in low-level IT skills with consequently poor prospects for future teleworkable jobs unless further training is provided. Action is needed to inform development bodies and to highlight successful projects to avoid wasting resources.

3.10 Italy

Summary

1998 saw several important developments in Italy, specially in the public sector. In June1998 the Government released a bill that, for the first time, introduces telework into Italian public administrations. According to the approved law, all civil servants can adopt "distant work" (this term includes home telework, telecentre-based work and mobile telework), should they comply with the regulation prepared by AIPA (Authority for IT in the Public Administration) and issued in February 1999 by the Council of Ministers. In 1998 the Government also approved other important bills, namely for digital ID cards, electronic signature, optical storage of documents, etc. All these innovations will give legal validity to contracts signed over the Internet and will facilitate the takeoff of e-commerce and e-business. The importance of e-commerce in the development of Italian economy was enforced by a bill dated march 1998 and followed up by a "Guideline for Electronic Commerce Policy", released by the Ministry of Industry in July 1998.

Telework has attracted the attention of Parliament, where important legal proposals were presented and new legislation is scheduled during 1999. Telework is spreading in the industrial sector, mainly as a consequence of a better level of ICT usage and as a result of the approval of the law for telework in public administrations. Online, the Italian telework website is one the most active national sites in Europe: the number of contacts in 1998 exceeded 400,000, and the associated discussion list "Telelavoro" has now 700 users.

Extreme variations in prosperity and employment between the North and South of Italy present a long-standing national problem, for which telework and teletrade could contribute to a solution if the industrial and public sectors start investing in new technologies .

Telework background and take-up of ICTs

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General background:
▪ Italy is substantially the largest and most highly developed economy in Southern Europe. Although Italy is one of the world's major trading nations, with per capita GDP near the overall European average, its level of investment in and use of ICTs is well below that of the major Northern economies:
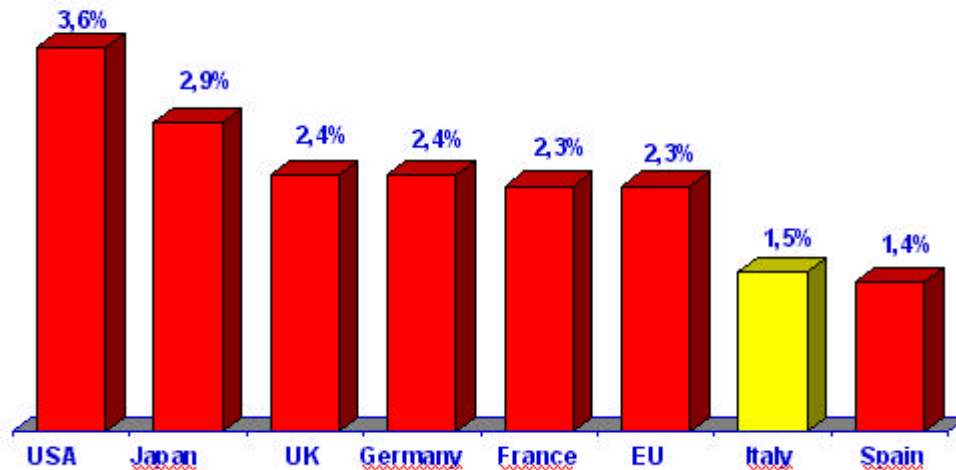
Source: ASSINFORM/Gartner Consulting, 1998

▪ The weak position of the Italian ICT market seems to be rapidly changing however. An analysis of 1998 trends shows that the ICT market reached 41.5 billion Euros, with an increase of 10.1% (compared to a rise in 1997 of 9.4%). The IT market registered a growth of 8.7% (similar to the EU average), while in 1997 the rise in growth was only 6.1% (EU average was 7,7%) and in 1996 was 3.6% (EU average 5.8%).
▪ The centre-left coalition governing Italy has made unemployment a national priority, being persistently high and recently around 12%. Recently published bills are expected to raise the participation rate of women to the labour market. According to CENSIS, a nation-wide recognised research institute, in 1998 the Italian labour market had a turn-over of 700,000 jobs, with at least 250,000 of them considered as being teleworkable.
▪ Tourism is an important industry for Italy as the world's fourth most popular tourist destination. Italy's exceptional wealth in arts and historic sites make the cultural domain a natural focus of Information Society activities.

Driving factors:
▪ In July 1998, the Ministry of Industry presented their *Guidelines for Electronic Commerce Policy* which fixed strategic goals to be achieved. In particular, the government sees electronic commerce as a tool for increasing the diffusion of Italian products in the world and for simplifying the market structure through a better de-localisation of public administration as forecast in the "institutional reform". Following the approval of these Guidelines, the Ministry of Industry created an Observatory on Electronic Commerce, composed of experts, industry and representatives from the social partners.
▪ Relative to overall Internet penetration, there is a high level of online activity providing a good cross section of local and other Italian language material to motivate take up and use by citizens. European Telework Week 1998 was very successful in Italy and well over 70 articles, radio and TV programmes addressed the benefits of telework.

The PONTE project

The PONTE project is the continuation of the Horizon project South Wind, established in cooperation with the Palermo Municipality, in which a group of physically disabled persons and social operators were trained to telework in the

transfer of alpha numeric and econo-graphic information from paper to electronic formats.

The new project, financed by the European Union and Ministry of Labour under the Horizon Initiative, is aimed at the creation of a new telework-based enterprise composed initially of the fifteen disabled persons trained in teleworking within the project South WIND. The firm will seek jobs on the market and will offer teleservices to Sicilian firms and public administrations.

The project includes the followings principal activities:

1. Research: a study will be undertaken on the application of telework as an organisational methodology through the analysis of best teleworkable activities. The investigation will be conducted at local level analysing the needs expressed by public or private corporate bodies and at European level via the partners involved in the project.

2. Enterprise creation: a cooperative firm, composed of disabled persons, will be constituted.

3. Education: a 180 hours training course in the acquisition of the necessary competencies for the carrying out of business will be finalised

4. Tutoring: in the phase of constitution of the enterprise and for the first twelve months of activity, the project specialists will ensure legal, administrative, managerial, and organisational assistance, as well as well consultancy for the elaboration of a suitable business plan.

- Telecom liberalisation is proceeding on time and there are now three new operators for fixed telephony and three for mobile (the last one, Wind, operates the new GSM frequency of 1800 Mhz). This competition brings important benefits for citizens, e.g. prices of long distance calls and mobile calls were reduced by an average of 30% compared to 1997, and Telecom Italia developed a new range of local and distance call tariff arrangements optimised for the Internet.
- Tiscali, a new entrant operator based in Sardinia and with a network in Rome and Milan is going to launch free internet access for all their customers in mid-1999
- Early liberalisation has already led to very fast growth in the use of mobile phones. The number of subscribers reached 20,5 Millions in 1998, as shown in the chart below.
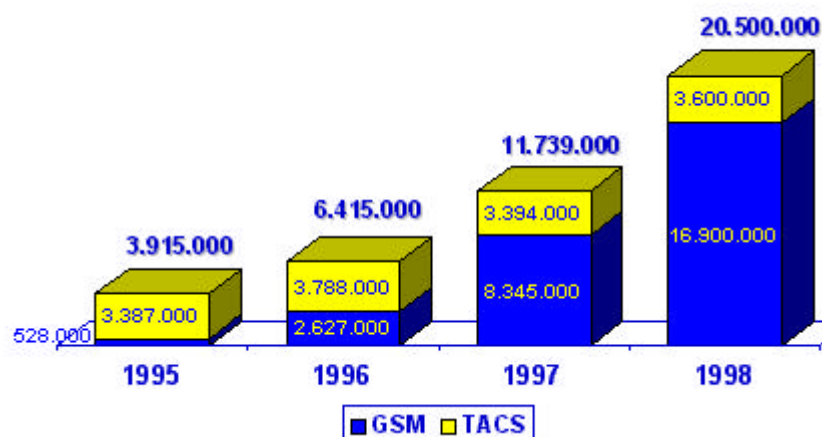
Source: ASSINFORM/Gartner Consulting, 1998

Indeed, Italy is one of the leading European countries as regards take-up of mobile telephony with 24 subscriptions per 100 inhabitants, only exceeded by the Nordic countries of Finland (56), Sweden (41) and Denmark (31) in 1998.

- The Government in a fiscal bill for 1999, gave a fiscal bonus to firms who reinvest part of their income in new technology, such as PCs, networks, etc. Forthcoming bills are likely also to provide funding to firms updating their IT equipment and software in order to be compliant with the Y2K bug and Euro compatibility.

▪   According to some Italian ICT analysts, the need to update information and computer systems for Y2K and Euro accounting is driving the renewal of IT in many industrial sectors and in public administrations. In 1998, for the first time in 20 years, expenditure on new hardware grew more than expenditure in new software and services (+10,3% versus +9,2%), and there was a clear trend toward the acquisition of open and distributed systems.

Telework and call centres create jobs in Sicily

Telework uptake is increasing in Sicily and creating new jobs. Around 230 new telework opportunities have been offered by Integrated Services, an ICT firm. The selected teleworkers will update clinical data on patients using health services with a smart card named Cartavita. Teleworkers need to be fully capable of using a PC without help since their job is to be based at home.

Wind Telecomunicazioni, the new entrant operator on the market of fixed-mobile telephony, is offering telework in Sicily. The new society of telecommunications, fruit of a joint venture between Enel (principal shareholder with 51%), Deutsche Telekom and France Telecom (with 24,5% each), is re-organising its customer care structure. Wind has already opened two call centres in Rome and Naples (over 700 operators) and a third one will be created in Palermo this year. Meanwhile, Wind will create in the Sicilian capital city the first corporate computer centre which will employ 70 people with qualifications in the areas of networks, information technology, marketing and sales, customer service and other functions.

Constraints:
•   In 1998, Italian digital leased line telephone costs were among the highest in Europe, acting as a barrier to competition among Internet Service Providers through points of presence networks. This situation was strongly highlighted by ISP, who held a Congress in Naples. According to their estimate, the cost of a 2 Mbit digital line in Italy is 10 times the OCSE average.
•   The very low level of use of PCs and Internet in Italy, especially away from the most industrialised regions, presents a major barrier to the spread of telework, since it means there is less awareness of the potential through "first hand" experience of networking. Additionally, use of PCs in the public administration is low.

Telework activities and results
▪   The Authority for Informatics in Public Administration released in 1998 guidelines for the usage of electronic signatures and the optical disk storage of legal documents, which will give legal status to contracts issued by email and other electronic means.
▪   In June1998 the Government released a bill that, for the first time, introduces telework into Italian public administrations. According to the approved law, all civil servants can adopt "distant work" (this term includes home telework, telecentre-based work and mobile telework), should they comply with the regulation prepared by AIPA (Authority for IT in the Public Administration) and issued in February 1999 by the Council of Ministers.
▪   Following the approval of the law, some public administrations launched telework pilots and the first successful results were presented during European Telework Week 1998 (County Administration of Perugia, National Pension Board, Scientifi Institute for Cancer Research, regional government of Emilia Romagna, city administration of Naples, etc.)
▪   Telework take-up in central public administrations is increasing very fast. In December 1998 the Ministries of Transport, Justice and Agriculture issued a joint proposal for the construction of 11 telecentres to be used by their employees; the Ministry of Regional Affairs presented in May 1999 a project for cooperative telework developed with the help of the ETD national coordinator; and INAIL (National Work Insurance Board) is also preparing an extensive telework project.
▪   The regional government of Emilia Romagna approved a plan for the creation of nine telecentres in rural areas.
▪   A *Plan 1997-2000* for the adoption of ICT in public administrations includes telework as one of the applications to be pursued.

- Following the presentation of a series of proposals made to Parliament in 1996-1997, the Italian Senate recently unified them in so-called Proposition 2305: *Norme per la promozione e l'incentivazione del Telelavoro* (rules for the promotion and encouragement of telework). The proposal is under discussion with social partners and its approval is scheduled by Summer 1999.
- The Italian Telework Website is substantially the most active national telework site in Europe, attracting 15,000 visits a month.
- Several companies presented in 1998 the results of their teleworking pilots.

Telework at Electrolux Zanussi

Electrolux Zanussi, the largest Italian producer of household appliances, has introduced telework to guarantee equal opportunity between men and women and to safeguard job and maternity arrangements. Telework is one of the last novelties introduced by the agreement signed at end of 1997 between Zanussi and the trades unions. Women employees with young children can now work the same hours as other employees, but are also able to choose times which are best suited to their own situation. These teleworkers must guarantee availability for half the normal time, distributed according to choice, in two daily "windows".

The agreement foresees that in the next two years, 40 of the 825 employees will use telework at the end or before the period of maternity leave.

Conclusions

Over the last few years the Italian telework scene has transformed from a limited amount of mainly academic research interest to become a hive of activity. In particular telework and e-business have made their way onto both the national and regional agendas, and there is growing interest among public administrations, employers and unions. Italy is placing particular focus on telecentres as a tool for local development and increasing work opportunities.

There can be little doubt that telework will now be on the increase in the Milan-Boulogne-Genoa triangle and in and around Rome. A very interesting and new development is the growing awareness of telework in the south of the country (especially in Sicily and the city of Naples), and the rapid progress in developing the appropriate legislative, regulatory and contractual arrangements.

The two issues that remain are the most challenging, but they are far from unique to Italy: to address the overall low level of use and experience of ICTs by citizens, managers and workers, and to understand how ICTs can best be deployed to address the problems of the Mezzogiorno. Telework is an application that citizens can readily understand; it should play a central role.

3.11 The Netherlands

Summary

The Netherlands has a very successful trading economy, with per capita international trade around twice that of Germany, France or the UK; it also has the highest proportion of employment in services of any EU economy (73% in 1993). With an overall high take up of ICTs and progressive labour market policies, together with well-developed language skills, the country is among the best placed in Europe to gain from the emergence of a global networked economy, so it is not surprising that the Netherlands is one of the European countries where telework is most widespread. The Telework Forum supported by a cross section of industry is pursuing both awareness raising and policy development programmes.

Issues include a relatively low level of ICT deployment in schools and among smaller firms. There are skill shortages, especially in high-technology jobs. The Dutch Cabinet recently formed a taskforce to tackle these problems which became operational in June 1999. This initiative ("werken aan ICT") aims to address the bad

image which IT has amongst some people, to improve the connection between study and work, and to promote the higher participation of women in the IT industry.

Telework background and take-up of ICTs

General background:
▪   The Netherlands economy is characterised by a high proportion of employment in services (highest in Europe); and an overall level of use of ICTs that ranks it among Europe's highest on the main measures:

	% employment in services, 1996	ICT investment, 1998		PC usage, 1997		Internet users per 1000 inhabitants, 1997
		as % of GDP	per capita (ECU)	per 100 white collars	per 100 population	
First	Netherlands	Sweden	Denmark	Sweden	Sweden	Sweden
Second	Sweden	UK	Sweden	Ireland	Denmark	Finland
Third	UK	Netherlands	UK	Netherlands	Netherlands	Denmark
Fourth	France	Denmark	Netherlands	Denmark	Finland	UK
Fifth	Belgium	Finland	France	Finland	UK	Netherlands

▪   In 1995, 44% of all households had their own PC, and this rose in 1998 to 57%, one third of which had their own internet connection. Five mobile telephone providers are active in the Netherlands, which is now driving prices down, and one third of the Dutch population are using mobile phones as per June 1999.
▪   In terms of the population as a whole with an Internet connection, this was 6% in 1996, rising to 13% in 1998, and in November 1998 15%.
▪   The Netherlands is very much a trading nation, with pro rata twice as high a participation in world trade as (for example) Germany.

	Population, 1997	% of world trade	trade/population ratio
Netherlands	15.6	3.49	22.4
France	58.3	6.92	11.8
Germany	82.2	9.62	11.7
UK	58.7	6.37	10.9
Italy	57.2	4.59	8.0

▪   Living standards are also very high and the country has progressive labour market policies, with a strongly analytical and innovative approach to addressing labour market issues.

Driving factors:
▪   The Transport Ministry has a long-standing interest in telework, and it is now widely seen as part of the solution to the country's endemic road congestion problems - Netherlands has Europe's densest road network relative to size of country. As well as the social and economic costs of road congestion, there is wide and growing popular concern about environmental damage aspects.
▪   Following some years of effort by individuals and the Netherlands Telework Forum, there is now political as well as commercial attention on telework. The Telewerk Forum coordinates the 'fileverdunningsplan" which is designed to enable 25,000 persons in the triangle of Amsterdam-The Hague-Utrecht to telework in order to avoid traffic congestion between 7.00 and 9.30 in the morning. The plan's feasibility study, financed by the Minstery of Transport, MediaPlaza, The ICT industry organisation, KPN Telecom, Toshiba and the Telewerk Forum, showed that 10,000 persons should be able to teleworkers in this

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geographical area. The Telewerk Forum has asked the ministries to invest 30 million Euro, the companies to invest in ICTs, and the unions and employer organisations to support the plan.

FUNctional Office: efficiency with comfort from Oracle

"The FUNctional Office creates workplaces providing optimal support to the diverse activities of personnel. It abandons the principle of a permanent workplace. If you need somewhere to concentrate on your task, then the FUNctional Office can provide it. But it also has facilities for people working in teams or from home. At the same time, it recognises that a workplace should be pleasant and comfortable. This explains the FUN element. You have to enjoy working in the FUNctional Office; a sort of home-from-home. Bringing some colour to the office and a real café facility creates the FUN aspects.

The explosive growth of Oracle personnel was generating a chronic need for more office space. And accommodation costs really eat into the budget. On top of that, the rental of premises is usually subject to multi-year contracts. This kind of inflexibility undermines a company's competitive position. A layout was needed with less surface area than the conventional small-office culture but, at the same time, more possibilities than a straight switch to open-plan. Only 13 square metres per person are needed instead of 23. And 55 workplaces for each department are sufficient for 110 employees." The FUNctional Office stimulates inter-departmental co-operation and creates situations in which solutions are discussed more deeply and better thought through. Employee accessibility has also been improved.

Second, it raises morale, which is crucial to staff turnover. Internal communication runs more smoothly and people feel more comfortable in their workplace. All the more reason to stay on at Oracle a bit longer! It costs on average US$ 75,000 to replace a member of staff. So Oracle is generating huge savings. The company can even recoup the costs of the project within eighteen months.

Finally, the FUNctional Office raises productivity. The different types of workplace available help personnel to work more efficiently. And things are easier to find now that the filing is done centrally.

The FUNctional Office was introduced in three phases:

1) Project Tango, was launched two years ago when everyone was given a laptop and a course on laptop operations. The switch from 1 central to 700 decentralised data centres was achieved in eight months.

2) aimed to improve staff mobility. Expertise, as well as routine tasks, had to become more mobile. People had to learn to file centrally and clear away chaotic heaps of paper. After a whole day of clearing up, 50% of the cupboards and drawers were removed. A new switchboard was installed and Oracle personnel are accessible under one number for the office, the car and at home. As the home workplace has to meet all sorts of statutory requirements each teleworker is allocated a budget for the purchase of a good desk and chair."

3) was the reorganisation of the office. Every single thing is new. The air conditioning, the ceiling, the carpeting. The primary consideration was to support the employee. Tables that could be electronically adjusted were installed and placed in such a way that people were not working against the light. Everything was optimally integrated. Even the kitchens which used to be white but now match the rest of the office. It's a place where people can really relax. Each floor will have its own unique character. One has brick-red carpeting."

Oracle's FUNctional Office won the Dutch Telework Award for the best telework project in November 1998. The jury regarded the project as thorough and integrally designed with proven results. The focus was not only on technical and office-equipment, but also upon the fiscal aspects, the homeworking environment and the training of the employees, all of which were well implemented and integrated.

- The Electronic Highway Platform organisation is working with Isoc.nl and gemweb (an election website with frequently asked questions) to prepare for the provincial state elections (www.provincies.nl)
- The Institute for Public and Politics issues a newsletter on new media containing a lot of information about relevant websites, political online chat fora and initiatives to stimulate the use of the Internet (www.publiek-politiek.nl/nmbb)
- A new tax regulation allows employers to pay a limited tax-free sum to compensate employed teleworkers for costs associated with working at home up to 400 Euros per year.
- Other forms of flexible working are well accepted and there is a general consensus about the need for continuing innovation in working methods.
- A successful economy has led to skill shortages, providing the motivation for companies to embrace new methods.
- The established magazine *Telewerken* is now in its sixth year of publication.
- The Netherlands has an open and caring society and is becoming established as a centre of competence in the use of ICTs for social inclusion, notably ICT training and telework as a means of access to work

opportunities for people with mobility problems. A new initiative is a school project which supports the elderly to learn about and use the electronic highway (www.human.nl/hv/nieuws/bemoei.htm)

Constraints:
- The high overall level of ICT investment conceals a very variable pattern, with relatively lower ICT use in Government and in small firms.
- With a net shortage of IT skills, Year 2000 ICT preparedness and Euro implementation are inhibiting implementation of other applications such as remote access to company systems and services.
- Legislation and regulation are largely based on traditional home working and are, in some aspects, inappropriate for modern teleworkers.
- As everywhere, management resistance and concerns are based on old-style "management by presence", with insufficient adoption of management by objectives and measurement of results.
- The positive pressure for telework generated by road traffic congestion is balanced by the Netherlands' excellent public transport infrastructure, which is being enhanced by innovative use of ICTs to optimise information and journey planning for citizens.

Telework activities and results
- The Telewerk Forum has supported more than 100 seminars addressed to both awareness raising and advice giving.
- The Ministry of Economic Affairs has published brochures about telework and other Information Society applications.
- The Transport Ministry has led pilots and programmes promoting telework for employees as a means of reducing car use and traffic congestion.
- A feasibility study has been undertaken at 8 government departments to investigate the possibilities of work process innovation.
- The feasibility study for the traffic reduction project has been presented to the press, to politicians and the ministries.
- IDC has published estimates and forecasts showing:

	1996	2000: unchanged environment	2000: growth scenario	2000: "disaster" scenario*
Mobile workers	336,000	640,000	664,000	754,000
Teleworkers	137,400	252,000	315,000	650,000
* "Growth" assumes some additional government actions to promote or enable telework. "Disaster" assumes a much more incisive set of actions triggered by (for example) a serious and prolonged traffic gridlock. The scale of difference indicates the importance placed on public policy action or inaction.				

- The Telewerk Forum has developed a comprehensive database of surveys which already numbers some 260 items. A case study database is also under construction.
- The annual Telewerk Award was organised for the fifth time, at which the Minister of Social Affairs and Labour made a speech arguing that the potential advantages of telework far exceed the risks.
- There is a number of web sites presenting employment and contract work opportunities, including a proportion of teleworkable tasks.
- The Transport Ministry has initiated pilots and programmes promoting telework for employees as a means of reducing car use and traffic congestion, and has recently published an up-dated "Telewek Handboek" reflecting the eight years of hands-on experience already obtained.

Conclusions

A new report from Heliview estimates that the current number of formal teleworkers is 200,000. Taking the broad definition of telework, including informal telework and the use of ICTs for mobile working, team working, call centre work, etc., the number goes up to about 1,200,00 or over 18% of the workforce, probably

Europe's highest. This means that predicted growth is still on target, but considerable acceleration could still take place if all the relevant policy initiatives were to come together.

The Dutch Government sees itself as a "launch customer" for Information Society applications and further positive actions could bring rapid take off. All the enablers are there in Holland - pressure from traffic congestion, a flexible labour force, skill shortages and a generally high level of ICT take up. Concerns include low use of ICTs among small firms and managerial resistance to new management approaches. Continuing promotion, information provision and policy development is needed to capitalise on the excellent opportunities.

3.12 Portugal

Summary

1998 was a turning year for Telework in Portugal. The organisation of the Telework '98, the 5th European Assembly on Telework and New Ways of Working, organised by the APDT (Portuguese language Teleworkers Association) and TELEMANutenção, a private company directly involved in telework since its creation in 1993, brought huge attention from all sides of society, as well as directly involving three Ministries and the President himself. This demonstrated how important telework has been perceived by the government authorities as well as the public in general.

The activities of APDT, operating since mid 1997, have succeeded in attracting the attention of many potential teleworkers. The interest of the media, from major newspapers and magazines to TV, has been strategically important in bringing to the attention of the whole of society the benefits of telework as a new way of working and improving the quality of life. All this has laid a solid platform for the strong development of telework in Portugal in the next millennium, and also has the potential of linking to more than 200 million Portuguese speakers around the world. 1999 will be another key year for Telework in the Portuguese language since APDT, supported by the Brazilian Government, is organising a South American Telework '99, in Rio de Janeiro, Brazil, linking to the European Telework Assembly in Aarhus, Denmark. This is one way in which Portuguese telework will cross continental boarders to assume its strategic position in the world and reaffirm the universality of the Portuguese culture and language.

The Government of Portugal has a progressive approach to Information Society developments, reflected in the 1997 *Mission for the Information Society* Green Paper. Portugal was one of the first European countries to implement online information services for citizens, with the deployment of public information kiosks in Lisbon in 1993-1994, leading to the InfoCid (information for citizens) programme with some 400 kiosks now deployed across Portugal and a linked Internet service. Portugal has also taken a proactive approach in education, with all schools now connected to the Internet and plans for one linked computer for every classroom by 2000.

This very active approach recognises that Portugal starts from a low level of investment in and use of ICTs and, historically, little activity in Internet Society applications such as telework. Telework features in the Information Society strategy and incentives for employers and citizens are in place or planned. Focused applications such as tele-medicine and tele-learning, with the use of technology to develop and sustain rural prosperity and jobs have tended to have higher priorities for Portugal than home-based teleworking.

Telework background and take-up of ICTs

General background:
- Portugal has a historically low per capita GDP and a low investment rate in terms of ICT as a percentage of GDP, leading to Europe's lowest density of PCs and second from lowest number of Internet users:

	GDP per capita ($ US), 1997	ICT as % of GDP, 1998	ICT per capita (ECU), 1998	PCs per 100 white collar workers, 1997	Internet users per 1000 population, 1997
Portugal	10,079	4.92%	477	27	19
EU lowest country	Portugal	3.93%	452	Portugal	11
EU highest country*	30,927	6.49%	1,554	85	148
* excluding Luxembourg					

- Portugal has enjoyed relatively low unemployment, especially relative to neighbouring Spain – 6.6% in May 1998 compared with Spain's 18.8%, and below the EU's average of 10.2%. A relatively low proportion of employment is in services (63% in 1995) although this has risen rapidly over the last decade
- Geographic and demographic considerations are important in determining Information Society strategy and development patterns. Portugal is at the edge of Europe, with long road and rail connections, but is culturally at the centre of a potential worldwide network of 200 million Portuguese speakers.

Driving factors:
- Portugal has a history of successful innovation in telecommunications based public services, for example the Multibanco programme, in which deployment of electronic purse applications has been ahead of more ICT-intensive countries like the UK, the use of networks supporting the collection of road tolls and the early computerisation and networking of Post office counter services.
- More recently, the Government's Green Paper on the Information Society in Portugal (http://futuro.missao-si.mct.pt/english/greenpaper/green.htm) has set out a comprehensive, coherent and distinctively Portuguese approach that includes telework as an important element.
- The Portuguese people are noted for their creativity and spontaneity, very positive characteristics in a period of rapid technology-based change.
- The still recent memories of revolution and constitutional development leads Portuguese political leaders to refer to the country as a "young" democracy, and there is consequently less resistance to further positive change than in countries with long-established institutions and methods.
- A world community of some 200 million Portuguese speakers provides the potential to establish critical mass for a Portuguese language and culture market at global level long before the local market within Portugal itself, and a bigger total "own language" market than for most European countries.
- Difficult terrain within much of the country, together with long distances and journey times to the main EU markets, can be expected to motivate Portuguese companies and citizens to ready acceptance of electronic networking, telework and teletrade in their dealings with the rest of the European Union as well as in the wider world.

Constraints:
- The relatively very low level of ICT use within Portugal presents a market barrier against rapid development of locally based Information Society applications, including home-based teleworking.
- It also presents learning curve and skills problems, in that fewer citizens gain experience of computers and the Internet through private purchase and use of the technologies.
- The relatively low per capita GDP makes computers, telephony and Internet costs appear high to Portuguese companies and citizens compared with (for example) perceived costs in Scandinavia.
- The generally understood business rationale for teleworking is weak in Portugal compared with countries such as the Netherlands, with high salaries, high overheads, dense and congested road networks and a generally high-tech economy.

Telework activities and results

- Microsoft, Portugal Telecom, Hewlett Packard, Telepac, Edson Comunicação and TELEMANutenção have shown how successful telework can be in creating new opportunities for disabled people. These six companies have created a consortium, with no support from the state, to create the right conditions for a group of unemployed disabled people working as independents but with all coordination and marketing support from TELEMANutenção. Each of the companies in the consortium contributes directly with its products to create the basic infrastructure that the teleworkers need, and TELEMANutenção and Microsoft have designed all the training (both initial and ongoing), so that the teleworkers would be adequately prepared for specific functions and with a certainty of a market to sell their services. The project, PORCIDE (THINK in English), has been functioning as an anchor and as an example of a simple and quick approach that fits extremely well the specific group of people it is aimed at (potentially around 4,000 in Portugal in total) and can become an active contributor to society. THINK won a 1998 European Telework Week Award.
- APDT participated in more than 20 seminars where telework was the topic for discussion. This reflects the growing interest from all sides of society in telework
- Major newspapers wrote more than 50 articles directly related to telework, still discussing basic concepts but nevertheless attracting the attention of large numbers of people
- Portugal Telecom, Hewlett Packard, Microsoft, "Reader's Digest" and several other mid to large companies have started to publicise their experiences with teleworking
- More than 200 SMEs have already adopted telework as an organisation strategy to increase their efficiency and scope
- The number of Internet users surpasses 750,000 in Portugal.
- More than 50 university students are writing theses on various aspects of telework, and APDT has started to coordinate their efforts in order to create better and wider knowledge on the subject
- TELEWORK98, the 5th European Assembly on Telework and New Ways of Working, attracted more than 500 participants, around 50% from outside Europe, with 80 Speakers and received huge press coverage in Portugal, Brazil, Europe and the US. Portugal Telecom was the biggest sponsor, followed by the European Commission, Sun Microsystems and the Portuguese Ministry of Labour, showing their clear interest in telework.
- For the first time TV carried the first reports on telework experiences
- More than 200 associates are now members of APDT
- The association of Portuguese Women Entrepreneurs launched a specific project, VIDA NOVA (a New Life), to promote telework
- APDT has launched the first survey on teleworkers in Portugal, the objective being to obtain detailed information about formal and informal, dependent and independent telework.
- There is still no specific legislation considering telework, but the first task force has been created by APDT, expecting results by 2000.

Conclusions

Telework in the form of working at home is not an immediate priority for Portugal, compared with focused applications of teleworking such as tele-medicine and tele-learning, and policies designed (a) to accelerate ICT take up by citizens, government and industry (especially small firms) and (b) to understand and implement telework and the related applications (teletrade and telecooperation) as a means of addressing the relative geographic isolation of Portugal within Europe and underpinning the prosperity and social cohesion of rural communities. In addition to capitalising on the telework and teletrade opportunities across the Portuguese-speaking world, Portugal also has a need to actively encourage positive outreach by Portuguese entrepreneurs, companies and communities to the higher-GDP countries of Europe, marketing Portuguese skills and capabilities to meet market demand rather than allowing new work opportunities to migrate outside the European Union.

Portugal is still following most of Europe in telework. However, for telework to really to take off most companies must change their organisational procedures. In Portugal change often needs to start from the top, following a top-down approach from management. In this context, government should take a lead and start a horizontal programme to train the top management of SMEs in new ways of working. The new up-coming generation of managers are the first adopters of these structural changes and obviously the ICT industry is leading the process. So it is expected that in the next 5 years a major restructuring of all the

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The THINK Project

THINK (Towards Handicap Integration Negotiating Knowledge) is a project that, taking into account the difficulties of the physically handicapped, using the methods made available by the new ICTs, and using telework, aiming to develop their capabilities, helping them market their services and thereby achieve full professional integration. The main objective of THINK in the short/medium term consists in the professional integration of twenty handicapped persons in the first two years, making them productive, profitable and self-sufficient in areas such as accounting, translation, word processing, programming and technical assistance.

THINK started formally on 6 October 1997 with a unique feature of being promoted by a consortium of private companies, without public financing. The consortium consists of TELEMANutenção (project leader and provider of the know-how), Portugal Telecom (provides telecommunication infrastructures), Telepac (provides Internet communications), Edson Comunicação (provides advertising and marketing), Hewlett Packard Portugal (provides hardware) and Microsoft Portugal (provides software).

THINK, known in Portugal as PORCIDE – *Projecto Original de Capacidades Integrando Deficientes na Economia* (Original Project of Capabilities Integrating Handicapped in the Economy), received in 1997 the award of "Major Innovation in the scope of the Information Society" from the Mission for the Information Society and the weekly newspaper EXPRESSO. More recently, it received in November 1998 the European Telework Award as the best contribution to European sustainability, as well as several praiseworthy mentions in various national and international conferences.

The scope of the project has been limited during its first two years of activity to 20 individuals, given the pioneer features of the chosen approach and the necessity of creating a monitoring and support structure for the teleworkers sufficiently solid to give them a means of providing their clients with a highly professional service. The recruitment process of the project was carried out according to very strict parameters. From an initial 80 candidates, 20 were pre-selected using suitability criteria related to the individual's situation and conditions, taking into account the inherent requirements of each market. In a latter phase, the individuals selected were provided both with the necessary material means and an adequate and solid training course. This was provided almost simultaneously by Microsoft for product knowledge, and by TELEMANutenção for the techniques inherent in telework itself. Follow-up has focused mainly on technical matters as well as the issues of social integration, the first steps of autonomy and competitiveness, both in terms of the market and the personal development process.

In the course of the training process, the consortium drew conclusions both from the feedback provided by the teleworkers and from the continuous monitoring undertaken. Two issues became obvious: that without team spirit it would be impossible to reach the proposed targets; and that not all the workers involved showed suitability for this kind of work. To solve the first critical issue, certain facilities were created so that the PORCIDES (as these teleworkers were named) wouldn't feel lonely or lacking support: weekly meetings amongst all concerned using a Microsoft product (NetMeeting); monthly live meetings in hotel resorts for face-to-face contact; the distribution of customer satisfaction reports both to achieve performance improvements and to create a healthy competitive environment; the provision of necessary material so that the teleworkers could take the Microsoft exams in order to qualify as internationally recognised technicians; and finally all personnel were encouraged to contact each other by phone on a regular basis to discuss both work and personal problems. During training there are also productivity premiums, sports contests, meetings on important dates, videoconferences, etc. Despite a psychologist being recruited to be easily available to all, two individuals had to leave this specific group (although keeping their link to the THINK/ PORCIDE project), and were rapidly replaced by two others who were trained and easily integrated. The group now formed has a level of cohesion, self-discipline, initiative and friendship which cannot be compared to most teams that work together in the same office in most of the companies in the country.

THINK thus has been a pioneer in in-group telework as well as enabling 20 handicapped to become professionally integrated in the labour market for the development of websites, translations and graphical work. In future, the consortium intends to use the know-how and experience obtained to create a second group of the same size, as this seems to be a manageable quantity. Experience also indicates that the future use of project leaders will be advisable in order to give the teleworkers a further incentive to excel in their tasks and to achieve promotion, as well as to counter a common complaint that because they are far away from head-office (which is also staffed by teleworkers) their efforts are not fully appreciated and career development is not taken seriously.

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The consortium also plans to expand into other European countries, as well as Brazil and the USA, and all studies indicate that Northern Europe is ripe for this sort of venture. In fact, the number of Internet users in these countries surpasses by far what happens in Portugal (although the growth rate in Portugal is remarkable), and the distances involved in some countries fully justify the creation of work groups geographically dispersed. Two further facts encouraged the consortium to consider internationalisation: most of the current customers are multinationals, and certain tasks, like translations or the maintenance of multilingual websites would be more easily made by nationals of the countries concerned.

economy will take place which adopts the new organisational models and new ways of working. At the same time, it is important in Portugal to focus on a better quality of life where people's resources are managed in a more efficient way, leading to greater enjoyment and more time spent with families instead of unnecessary commuting.

3.13 Spain

Summary

Spain has particular national opportunities in the Information Society. A form of Spanish is the first language in some 28 countries and for close to 300 million people. Also, travel and tourism is one of the main sectors for early online activity and Spain has the highest tourism revenues pro rata among the larger EU economies. A large land mass with a thinly distributed population provides an incentive for early adoption of telework, especially in applications such as medical services. High unemployment provides another incentive to understand and use telework and teletrade methods.

During the years 1998-99 the economy has improved considerably in Spain. Requirements for joining the Euro were met without difficulties and recent labour legislation introduced greater flexibility and created a lot of employment, but mostly of a temporary nature. However most temporary contracts are being renewed. The low mortgage rates have had a positive impact on construction, which creates most of this temporary employment. New and long-term employment is also being created, mostly in the new technologies.

Telework still means working from home for a great number of people in Spain. However there has been very little news or talk about telework projects within large companies where telework is normally of the mobile or home-based part-time types, both of which lend themselves to straightforward statistics about the number of clearly identified teleworkers. The growing forms of telework in Spain are, however, mainly forms that are difficult to measure:
- self-employed individuals
- small groups of teleworkers which constitute distributed companies
- many limited informal teleworking agreements among SMEs
- a growing number of regional schemes and projects involving the public and private sectors in local environments.
- telecentre projects.

Telework background and take-up of ICTs

General background:
- Spain is Europe's fifth largest country in population terms. The population is more sparsely distributed than in the other large economies, because of Spain's large land mass and the dispersion of some of the population on outlying islands (Canaries and Balearics). Spain is also quite highly regionalised in its administration, being divided into 17 *comunidades autonomas* (including the Canary and Balearic island groups).

	Area in km² (thousands)	Population (millions), 1997	Density (people per km²), 1997
Spain	505	39.3	78
UK	243	58.7	242
Germany	358	82.2	230
Italy	301	57.2	190
France	544	58.3	107
Finland	338	5.1	15

▪ The per capita GDP is much the lowest of the larger EU countries, though higher than those of Greece and Portugal. This has the effect of making ICTs appear relatively expensive for consumers and small local enterprises. Spain has a low level of investment in large-scale computer systems and in PCs per head of population, but a somewhat higher level of use of PCs relative to white-collar workers. There are significant differences in earnings levels between the main city and industrial areas and the rural hinterland.

	GDP per capita ($ US), 1997	ICT as % of GDP, 1998	ICT per capita (ECU), 1998	PCs per 1000 population, 1997	PCs per 100 white collar workers, 1997	Internet users per 1000 population, 1997
Spain	13,282	3.93%	497	80	50	47
EU lowest country	10,079	Spain	452	60	27	11
EU highest country*	30,927	6.49%	1,554	350	85	148
* excluding Luxembourg						

▪ Unemployment is the highest of any major EU country at 18.8% in May 1998. Labour laws that severely restrict flexibility have discouraged companies from hiring full time permanent employees and led to high levels of temporary or fixed term contract working. Government spending has been significantly reduced in recent years as part of successful efforts to qualify for entry to the Euro.

▪ Spanish is one of the world's most widely spoken languages, after Chinese and English. A form of Spanish is the main language in some 28 countries, especially focused in South America, and there are others where Spanish is the native language for large minority populations, notably in the USA.

Language	Number of first speakers (millions)	World ranking
Chinese/Mandarin	885	1
English	322	2
Spanish	266	3
Bengali	189	4
Hindi	182	5
Portuguese	170	6
Russian	170	6
Japanese	125	8
German	98	9
French	72	13
Italian	40	27

- Within Spain itself, there are quite substantial minority language populations - Castilian Spanish 74%, Catalan 17%, Galician 7%, Basque 2%.
- Tourism is an important industry. Relative to national GDP, Spain has the highest tourism earnings of any country world wide.
- Relative to the other large EU economies, Spain has a higher average number of persons per household. This factor reinforces others in suggesting that telecentres rather than home based teleworking is an appropriate focus for telework activities in Spain.

Driving factors:
- The large world population of Spanish-speakers provides early critical mass for online activities, compared with most European countries.
- The fast growth of e-commerce, particularly business to business, and the wider use of the Internet. There are about 1,700,000 individuals subscribed to the Internet and a total population of 2.5 million full and part-time users. It is among these people that most teleworkers are found.
- AECE, the Spanish E-Commerce Association, estimates the amount fully traded on the Internet (including on-line payment), at about 5 million Euros in 1997, and at about 21 million Euros in 1998. Considering all the factors such as access costs, the growth in the number of homes with PCs or Web TV connections, the number of companies operating on theInternet, etc., AECE estimates that in 2001 e-commerce will have reached a figure of one and a quarter billion Euros in Spain.
- Three companies offer national Internet access for ISPs: INFOVIA+ of Telefonica, RETENET of Retevision and INTERPISTA of British Telecom.
- Three companies, Telefonica, Airtel and Retevision offer mobile telephony
- There are also three telephone operators, with Telefonica, Retvision and Uni2 sharing the grid and competing in prices and services.
- In Spain, the ICT sector R&D expenses represent 18% of all R&D. In proportion, it is the sector that spends most, more for example than the chemical or automobile sectors. More than 60% of this production is exported.
- ANIEL, the association of electronic and telecommunication industries estimates that every R&D job created in this sector generates over seven jobs in other sectors. However, the 0,9% of the Spanish GDP spent on research amounts to just half the EU average percentage of GDP.
- The large unemployment rate and the impossibility of creating sufficient traditional full-time jobs create an additional incentive for the large number of younger people, more flexible by age and by necessity, who are interested in the new ways of working.

TELETRABAGES

TeletraBages is a project under the ADAPT Programme supported by the Employment Directorate of the "Generalitat de Catalunya" and the "Consell Comarcal del Bages" (the local administration of the Bages area, located near Barcelona). The project also involves the "Consell Tecnico del Bages" and the Chamber of Commerce of the town of Manresa.

The project itself involves several actions running simultaneously:

- a programme for awareness and diffusion
- a systematic search for sources of telework
- a programme for the creation of new projects among enterprises
- consulting facilities for SMEs
- the collection of data from European projects
- the creation of didactic material for advice and training
- the study of professional mutations
- professional orientation and consulting
- training
- the creation of a web site and a network for exchange and synergies (http://www.bages.org)

There is a strong emphasis on regional development, group work and the definition of new competencies.

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TeletraBages has found that the types of activities which are adaptable for telework are:

- e-commerce (purchase, sales and rentals)
- information and on-line help desks
- administrative secretarial services
- electronic watching
- graphic design
- translations and text corrections
- tele-medicine

The project is well advanced and has already created work opportunities. An exchange facility for job offers and requests created on the web has received many visits and has resulted in several agreements between employers and individuals.

TeletraBages puts a strong emphasis on the definition of competencies in relation to ICTs and on the need to inform and assist SMEs in adopting ICTs and telework as value adding tools and practices.

Constraints:

- A high ratio of persons per home, coupled with relatively low penetration of ICTs, means that the familiar model of home based teleworking is less attractive in Spain.
- Widespread ignorance and lack of awareness of ICTs.
- Obsolete labour legislation based on industrial society patterns and norms.
- Mental barriers amongst the greatest part of the population mitigate against change.
- In order to promote the new ways of working, distance and flexible working, it is necessary that SMEs, which account for over 80% of all jobs, start using ICTs and become aware of the advantages of telework in its broadest sense. Considering that half the SMEs are hardly using computers at all, and that 80% do not have Internet connections, the potential for these new ways of working and for the creation of new careers is limited. However, in e-commerce, 44% of the companies active on the Internet are small enterprises, against only 17% of medium to large ones.

TURISTA

Turista is a project managed by the AET (Asociación Española de Teletrabajo), the Spanish Telework Association. It is financed by the DDI programme of the Ministry of Industry within the SMEs initiative and involves two pilot groups. One group is made up of would be teleworkers and members of the Telework Association. The other group is made of SMEs active in tourism.

The first group is working on defining the competencies shared by the teleworker community and on the inventory and marketing of those competencies via a highly flexible and intuitive database. To create this database the Gingo software of the French Company TriVium (www.trivium.fr) has been chosen because of its user friendliness and applicability to a variety of human capital management problems. From collectives ranging from high-tech personnel in very large enterprises, to students faced with the problem of studying in foreign countries, immigrants and the unemployed, the GINGO tree allows a group to know, share and improve its own capabilities.

The second group is investigating the activities, based on GINGO, of the "knowledge tree" of the teleworker community, that can add value to the products and services and that lend themselves to distance working.

The profile of jobs and activities demanded by the companies can then be matched with the personnel competencies offered by the teleworkers and with the additional training needed.

TURISTA puts a strong emphasis on the definition of competencies in relation to ICTs and on the need to inform and assist SMEs in adopting ICTs and telework as value adding tools and practices.

Telework activities and results

- The Telework Association (AET) published a teleworking handbook in 1998, with support from Motorola and IBM.
- The AET supports an active website with online discussion, Frequently Asked Questions, etc.
- Solutions to the unemployment problem have mainly been sought on a local basis; Spain has not to date succeeded in "importing" telework opportunities that has led to employment growth in, for example, Ireland and which is beginning to take off in the Benelux countries.

- There are over 40 telework centres operative or in prospect. Most are part of European or regional projects involving some form of public funding. However, some are self supporting and provide commercial activities beyond the main activity of training. Such projects raise awareness and serve as pilot schemes.
- Many new forms of flexible working are a consequence of the general development of activities permitted by, or related to, ICTs, and in particular to the development of electronic commerce.
- A great number of public administrations, ministries, town halls, regional administrations, etc., now have their own websites and are accessible via e-mail. The tax agency, which has gone on-line for a variety of active services beyond the passive information available on the site, now permits companies to process their tax returns on-line via the Internet. An interactive mechanism for enquiries received no less than a quarter of a million enquiries in the first month. An e-mail system with several mailboxes backed up by experts, not only answers questions, but also helps process returns and complex cases.
- Spain has a Commission for the Internet in the Senate, as well as a Commission, created by the Ministry of Energy and Industry, for the Information Society. The latter has participated in the Internet Fiesta with an initiative involving enterprises and entrepreneurial associations. However, there is as yet little impact on ordinary citizens, most initiatives being limited to the institutional level.
- Regions are very important in Spain and the level of autonomy is an important fact of the state administration. Much progress has been made regionally and some of the autonomous regions have advanced telecommunication infrastructures, locally available networks and well-defined policies for the promotion of the Information Society. It is probably at this decentralised level that progress in telework and other Information Society activities will be most evident.

Conclusions

In a country like Spain, as in many other European countries, effort must not only be directed at individuals or the large corporations, but most of all at the SMEs. However, this cannot be done individually for SMEs need not only information, but also assistance and guarantees concerning the methods, viability and success of the experiments in teleworking. This is best achieved in local projects involving sectoral, regional, and employers associations on the one hand, and public and professional institutions on the other. This is, indeed, an approach which Spain is pursuing.

However, although Spanish institutions and enterprises are active participants in all European Union programmes, including Information Society development, a clear and strong national vision of how telework, teletrade and telecooperation can be applied to address economic and employment growth has yet to emerge.

Spanish people are natural communicators, and Spain has a powerful world image, reinforced by history, by the worldwide use of the language, and by its popularity as a tourist destination. There is an urgent need to develop Spain's position in telework, teletrade and telecooperation through planned approaches that capitalise on Spain's strengths.

3.14 Sweden

Summary

A full EU member state since 1995, Sweden is one of Europe's most intensive users of Information Society technologies and was the birthplace of the telecottages concept. The Swedish population is the second most thinly distributed after Finland; the Norrland region for example, with only 1.2 million inhabitants spread across 58% of Sweden's land area, has an average of less than 5 people per square kilometre. Sweden is highly industrialised, with a high proportion of world class companies relative to the size of its economy. Sweden is historically a trading nation and Swedish business travellers and holidaymakers are encountered throughout the world.

The labour market is one of the most highly organised in Europe, but since the 1970s there have been significant changes in the "Swedish social model"; labour market legislation was revised in 1997 and there is ongoing review of the regulatory impacts of technological change, include teleworking. Telework is relatively widespread, and Sweden is one of the European countries with the greatest take-up. There remain, however, important fiscal and regulatory barriers.

Telework background and take-up of ICTs

General background

- Sweden vies with Finland as Europe's most intensive user of Information Society technologies. It invests a higher proportion of GDP in ICTs than any other European country and occupies first or second place on most of the relevant metrics (see table over page).

- Sweden is a relatively prosperous European country, with GDP per capita similar to the Netherlands, but only half the Netherlands' population spread across more than ten times the land mass. The northern part of Sweden (Norrland), with 58% of the land area, has only 14% of the population (see table over page).

	ICT as % of GDP, 1998	ICT per capita (ECU), 1998	PCs per 1000 population, 1997	PCs per 100 white collar workers, 1997	Mobile phones per 100 inhabitants, January 1998	Internet users per 1000 population, 1997
Sweden	6.49%	1,520	350	85	41	148
EU lowest country	3.93%	452	60	27	9	11
EU highest country*	Sweden	1,554	Sweden	Sweden	46	Sweden
* excluding Luxembourg						

	GDP per capita (US $), 1997	Population (millions), 1997	Land mass (sq km)	Persons per sq km	Employment (%), 1996	
					Industry	Services
Sweden	25,559	8.9	450	20	26	71
Netherlands	22,720	15.6	42	371	23	73
EU highest	30,927	82.2	544	N'lands	38	N'lands
EU lowest	10,079	3.6	43	15	N'lands	55
Norrland region		1.2	261	5		

- Although Sweden has become very much a service economy from an employment standpoint, with Europe's second highest proportion of employment in services, the manufacturing sector remains important and accounts for some 80% of exports by value. The services sector includes a high proportion of public services employment and Sweden has not yet developed a strong exporting position in services. Public agencies account for one third of all employment.

- Sweden has been a leading advocate of free trade. In manufacturing, Sweden's count of home based multinationals is very high relative to the scale of the home economy, and includes several household names - Ericsson, ABB, SKF, Volvo, Saab, Atlas Copco, Scania. Swedish-owned multinational firms account for about half of total Swedish exports. In recent years Sweden has also attracted investment by foreign owned multinationals. With a long history of International trade and involvement, Sweden is internationalist in outlook - for example a high proportion of Swedish websites carry material in English as well as Swedish; many also carry material in other languages, particularly German and Russian.

- Sweden's economic growth is almost entirely attributable to the private sector. In the public sector, a weak financial position has led to major cutbacks both in government consumption and the number of public employees. Private sector production growth has occurred largely as a result of higher productivity and

increased working hours per employee, but the increase in the number of employees has not been sufficiently large to offset the reductions that have occurred in the public sector. Total employment thus did not change greatly during the years 1994-1997.

▪ With Denmark, Sweden shares Europe's highest level of participation in the labour market; this includes a very high level of participation by women, with only four percentage points difference in participation rates between men and women. However, more women than men are in part time work or in low paid jobs and there are pressures for further steps towards equality of opportunities.

▪ Labour productivity increased between 1990 and 1997 by 60% in the knowledge intensive industries and by almost 40% in the capital-intensive industries. Due to strong export performance, Sweden's market shares have increased by more than 20% since 1992.

▪ Although unemployment in Sweden has been close to or just below the EU average (8.9% in May 1998) this is an extremely high level relative to post-war Swedish standards (between 1970-1990 unemployment never exceeded 4%). There is controversy about how to tackle unemployment. The Government has sought to promote increased labour market flexibility so as to increase the competitiveness of Swedish industry, but there are strong voices advocating an alternative approach based on increased stimulation of domestic demand and improved public services.

Telework in Virtual Organisations

This is a telework project in the northern region of Västerbotten, Sweden. The initiator is the Swedish Association of Local Authorities and its regional branch in the county of Västerbotten, in collaboration with ToppLedarForum. The project consists of three different groups of teleworkers:

1. employed teleworkers working partly from home or from local telecentres. This group is situated in the areas of Umeå and Vännäs.
2. employed teleworkers with special competence working partly from home. In this group there is also a participant company with two separate workplaces at a distance of 130 km from each other.
3. SMEs teleworking in virtual organisations in very remote areas. In this group there is a network of SMEs in the graphics branch (a printing shop, a web-designer, a media specialist, etc.). They will develop virtual collaboration using the Internet as a tool.

The purpose of the project is to:

▪ investigate and evaluate different methods for teleworking within participating organisations
▪ investigate and evaluate different security solutions
▪ investigate and evaluate different online conferencing facilities

The project will be studied from a sociological perspective concerning management and participants. This will be undertaken using telework with the Internet as a tool.

The whole project group has their common workplace on the Internet and all information concerning the project is placed there, including discussions and results from the project itself as well as the project management function. The results will be presented to other organisations and groups of interested persons.

Contact Lilian Holloway, project manager: lilian.holloway@ammarnas.net

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Driving factors:

▪ Long distances and small, isolated communities led to Sweden becoming the birthplace of the "telecottages" concept and today encourage adoption of practical applications of Information Society technologies, for example in tele-medicine.

▪ The high participation of women in the workforce means that in most households both parents are in work; this motivates positive approaches to flexible working methods so as to facilitate a good balance between work and family responsibilities.

▪ There is an excellent telecommunications infrastructure and Sweden has been a world leader in telecommunications liberalisation. Telia (the incumbent telecommunications operator) expects to provide broadband communications to 98% of Swedish homes by 2004.

▪ There is an active telework practitioners' community and experts from Sweden are regularly invited to speak at international as well as European conferences.

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- The strongly international flavour of the non-services sectors leads to high dependence on telecommunications and the early adoption of online working methods within companies in these sectors.
- Until now, the positive attitudes of individuals towards ITC applications and the acceptance of new ways to work has been a strong driving factor for telework, so that developments have been largely bottom-up. It has only been recently that private sector enterprises have begun to see the benefits for business, and the public sector is even further behind in this respect.

Constraints:
- Yesterday's rules and regulations are not compatible with a flexible labour market. These obstacles are still there, and this fact may explain why telework is still relatively undeveloped within the public sector in Sweden.
- According to a Government research, the main barrier for telework is the character of the work itself and the need for colleagues. Very few teleworkers reported that working from home as such is a barrier. The employer is considered a major barrier for young employees and those with higher education.
- The Swedish tradition of a highly regulated and organised labour market constrains innovation in working methods and structures. There have been uncertainties and barriers concerning the treatment of employed teleworkers from both regulatory and fiscal standpoints, and there have been continuing concerns about unemployment which make employees less inclined to take the perceived risks of involvement in new working methods. Changes have now been suggested (see next sub-section) but have also been criticised as being too small

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Senior Surf Sweden

One day in September 1999 will be Senior Surf Day all over Sweden. This is being organised by SeniorNet Sweden (a non-profit organisation founded 3 years ago to promote the use of the Internet by older citizens), and has the following aims, to:

1. increase the number of active Senior Internet users in Sweden
2. show the possibilities of the Internet to Senior Citizens
3. through libraries all over the country, involve a large number of Senior Citizens in activities using computers and the Internet
4. show the importance of libraries in the Information Society
5. promote other activities, inter-activities, products and services on the Internet in cooperation with Swedish Telecom, Sweden Post, Microsoft and others
6. be one of the major activities coordinated by the Department of Social Welfare during the United Nations Year of the Elderly 1999
7. become a yearly event in order to show the importance of Senior Citizens in society
8. promote the idea of Senior Surf in Europe during the Year of the Elderly 1999

All public libraries in Sweden are being invited to participate. SeniorNet Sweden arranged seminars during spring 1999 to train responsible Senior Tutors in libraries all around the country.

During Senior Surf Day, at least two members from SeniorNet Sweden will act as Internet Guides at the libraries. They will work to get as many interested Senior Citizens involved as possible and surfing on the Internet. Senior Citizens will be teaching other Senior Citizens. After Senior Surf Day, study circles and short introductory courses will be arranged at local level for interested Senior Citizens.

Significant advantages in the telework context of ensuring that older people become active users of the Internet and other networking tools include:

- from the individual's perspective: providing the means to enable workers contemplating retirement to slowly decrease their active involvement in the labour market rather than simply come to a complete stop
- from the employer's perspective: as many elderly workers possess much needed expertise and skills, teleworking and other forms of flexible working enable employers to retain access to these skills for a much longer period and often on an as needs and flexible basis
- from society's perspective: retaining, if only on an ad-hoc and part-time basis, the involvement of older workers in the labour market instead of taking early retirement, which many do today, benefits both the economy by retaining skills and expertise in short supply (many of which will become even scarcer as fewer young persons enter the labour market over the next 10 to 20 years) and the social services by reducing potential payments and keeping elderly persons more active and integrated in society

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The web-site being used is http://www.seniornet.se

Telework activities and results
- In 1997 Sweden hosted the annual European Telework Assembly, the main venue for policy debate on telework and related topics, which attracted a large number and range of practical case studies on telework, particularly from Sweden and neighbouring countries.
- The Swedish Confederation of Professional Employees (TCO) has produced a booklet, *A Good Teleworkplace*, following its earlier *Working at a Distance*.
- A new support organisation *enter-by.net* was formed in 1998, to complement the work of the established *Distansforum*. Enter-by.net focuses on self-employed teleworkers.
- In 1997, the Ministry of Labour set up a committee on the Regulation of Telework which worked in collaboration with the Swedish IT-Commission and the Distance Learning Committee, DUKOM. The committee reported to the Swedish Government in September 1998 stating that Sweden has a great potential for telework, that more flexible forms of working potentially have great advantages for the individual as well as for the employer, and that telework is suitable for persons who can control their own work and how it is performed. The following changes were proposed (see also conclusions below):
- − one minor change within the labour law.
- − one minor change within the taxation law in order to enable the employed teleworkers working from home to make a small tax deduction of maximum SEK 2,000 per year.
- − a free web site with information on telework should be made available.
- − pilot projects on telework should be set up within the Swedish Government, in order that the government can act as role model for the public sector.
- − more research on telework is needed to investigate, for example, more on telework and gender, regional differences, consequences for the individual, etc.
- The Swedish Government is preparing a forthcoming Information Technology Bill, in which new goals will be set aiming at making necessary legislative changes to broaden and expand the use of ICTs. This means that it will be necessary to review the need for changes to legislation to cover, for example, teleworking.
- According to IDC Research, 1,350,000 PCs were sold in Sweden during 1998, which is an all time record. The main reason, as in Denmark, is that Sweden has a tax reduction system when buying PCs.
- IDC Scandinavia also reports that 39% of the Swedish population are frequent Internet users, 13% are frequent shoppers on the Internet, and that the majority of Internet shoppers are well-educated men with high incomes. The typical Internet user can often be described as male, having equivalent usage from both home and work, and living in both single households and families. The difference between sexes has not changed very much since the last survey in autumn 1997. It is estimated that around 40% of Swedish Internet users are female.
- According to surveys carried out by the Swedish Association of Local Authorities, the Federation of Swedish County Councils and the Swedish Church, about 300,000 persons work from home; almost 9 percent of all employed people. More than 191,000 persons say they have an agreement with their employer that allows them to work from home on a regular basis. It is more common that women work from home; 135,000 men are teleworkers, compared to 170,000 women. Six percent of persons employed in the private sector are teleworkers, the majority here being men (80,000), whereas the majority of teleworkers in the public sector are women (110,000).
- One quarter of the local authorities claim they have or are planning to implement telework. The research shows that among the four largest local authorities in Sweden, telework is very unusual, and is mostly at pilot project level and very limited. One conclusion from the research is that if the frequency of telework is equivalent in all Swedish local authorities, around 250 persons out of 800,000 people employed in these organisations work from home one day a week. Similarly, there are only a very few teleworkers within the county councils. Approximately 100 persons telework, and half of them are employed within Stockholm

County Council. The research also shows that there is no significant difference between cities and rural areas.

▪ In a 1999 survey conducted by NUTEK (the Swedish National Board for Industrial and Technical Development) on the use of IT by 3,500 Swedish SMEs, it was found that telework is much more attractive for businesses in large cities than it is in rural and thinly populated areas. This goes against, to some extent, what had always been supposed about the value of telework in peripheral areas, but seems to be explained by the fact that teleworkers wish to complement their virtual contacts with physical contacts, rather than virtual contacts being seen as replacing physical contacts. In the big city context, of course, telework can ease commuting and other congestion problems, which are not considerations in rural areas, and where people are much more used to travelling even long distances.

Conclusions

Two main influences strongly dominate in Sweden. On the one hand Government policies and regulatory actions play a key role, because such a high proportion of all employment is in public services and because of the high level of labour market organisation. On the other hand Sweden's national revenues and a high proportion of private sector employment depend on large multinationals - both Swedish and foreign owned - who trade in an increasingly global context. The future development of telework among employed people in Sweden is therefore strongly dependent on the results of the committee on the regulation of telework, and the Government's response. With more than 30,000 self-employed teleworkers, whose working conditions and work security, insurance, health care, and many other issues, all need to be taken care of personally, as opposed to being the responsibility of employers in the case of employed persons, there is a great need for support and qualified information services for this group. The Swedish Government's recent suggestion that two minor changes to the present labour laws are needed was a disappointment to the Swedish Networker Association which wanted more. Even so, there is still plenty of scope for bottom-up innovation by individuals and small firms participating in the networked economy at European and International levels.

The public sector is lagging behind the private sector when it comes to telework. There are already great difficulties in recruiting new staff within certain parts of the public sector where there is direct competition with the private sector. In the latter, more flexible work forms are considered as an important competitive factor when recruiting new staff. This will be even more obvious in the future, given that the public sector has an extremely large number of employees due to retire within 5-10 years.

3.15 United Kingdom

Summary

Factors promoting the adoption of Information Society methods in the UK include the early liberalisation of telecommunications, which has led to price reductions and a proliferation of competition and new services, together with a lightly regulated labour market that presents few barriers to innovation. Telework adoption has been accelerated by Europe's most well-established telework association, which has positively influenced media coverage as well as providing information services to the public.

As a result, the UK has the largest proportion of telework take-up of Europe's five major economies, as well as the fastest rate of introduction of 'concentrative teleworking', as banks, insurance companies and other sectors switch from High Street presence to telephone-based sales and support. The UK is one of the first countries to collect telework statistics on an annual basis through the Labour Force Survey.

The UK also has the highest penetration of Internet use in the major economies, and further dramatic Internet growth has been experienced in early 1999 with retail groups (from Dixons through to Tescos) offering 'free' Internet access. Approaching one million subscribers have now signed up to the Dixons Freeserve Internet in its first few months since launch

Telework background and take-up of ICTs

General background:

- Among Europe's major economies, UK has a relatively low per capita GDP but a relatively high level of investment in and take up of Information Society technologies. The level of use of ICTs is remarkably high when considering the UK citizen's relatively low earnings and spending power:

	Per capita GDP, 1997	ICT investment as % of GDP, 1998	PCs per 100 population, 1997	Internet users per 1000 population, 1997	Internet hosts per 1000 households, 1998	GDP per head in purchasing power parity (PPP)*
UK	21,952	6.39	22	119	24.6	71.4
Germany	25,363	4.45	22	64	17.6	74.4
France	23,691	5.00	18	43	8.7	77.9
Italy	19,821	4.06	10	24	6.7	73.6
* PPP is derived by considering GDP per head against the local prices of a standard basket of goods and services; the figures relate to USA = 100 (Source: EIU)						

EITO forecasts that by 2001 the UK will have more than 12 million Internet users, providing both a platform for teleworking and an incentive for existing enterprises to adopt

- The UK's low usage of ISDN has previously been seen as a barrier. However, a recent repackaging of ISDN by BT (the Highway product), aiming at a domestic and small business user, has taken place which is claimed to have greatly increased connections. This alone does not increase the potential availability of ISDN to rural areas. Recent changes in the regulatory environment opening the local network to competition mean that broad band services such as ADSL will now be rolled out.

- The UK social and economic environment is lightly regulated and scores high on most measures of competitiveness, economic freedom and a positive environment for business. This, together with relatively low wages, taxes and social charges, has attracted a high level of inward investment by both European and other multinationals, and the UK is the European entry point for many USA and Far East multinationals.

- The UK was the first major European country to liberalise telecommunications and privatise the state monopoly operator. The telecommunications regulator (OFTEL) was given objectives to encourage and facilitate investment by competitors and until very recently has restricted BT's freedom to reduce prices so as to allow scope for competitors to come in under the BT price levels while still making a profit. Even with these constraints, prices have fallen substantially; since 1984/5 the average cost of a BT daytime call to the USA has fallen by 89% in real terms. The regulator has also placed a high emphasis on easy access for new competitors to consumers and businesses, establishing stringent rules for competitor use of the BT network. This has led to a proliferation of new products and services and price competition from competitors who in some cases are reselling capacity rather than building infrastructure. There are today plenty of resellers of network lineage, but cable is still only a feature of urban areas. The wireless based telecoms company Ionica ceased trading in 1998.

- Mobile use continues to grow with talk of banning use of mobiles in certain railway carriages giving way to the realisation that rail lines with frequent tunnels and lack of repeater stations are not good places to make a call from.

- As of April 1998, tax laws now allow employees who work from home to claim reimbursement for journeys to an office. But working from home must be required by the company rather than option selected by the employee.

- There is ever increasing interest in teleworking from the media with the latest theme being family friendly policies encapsulated by the term telehubbies – following the discovery that male teleworkers outnumber females.

- Labour Force Survey data issued by the UK government Office for National Statistics show :

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Year	1997	1998	1999	
Teleworker Homeworkers[1]	225,000	256,000	255,000	(narrow definition)
Teleworkers using home as base[2]	504,000	589,000	693,000	
Occasional Teleworkers[3]	285,000	301,000	357,000	
Total	1,014,000	1,146,000	1,305,000	(wide definition)

1. Teleworker homeworkers include only those who (in their main job) work mainly in their own home.
2. Teleworkers who work in different places using home as a base (also referred to as 'home-based teleworkers') includes those who (in their main job) work in different places using home as a base.
3. Occasional teleworkers include those who do not usually work either in their own home or in different places using home as a base but sent at least one day in the reference week working in their own home or in different places using home as a base.

These figures show a consistent 13% growth over the three year period, but the growth in last year's figures shows the greatest increase in those working flexibly, e.g. using home as a base and occasionally teleworking as being the largest part. A forward projection on this basis indicates a teleworkforce of around 10% of the total work force being reached in 2004.

- One of the latest estimates of call centre employee statistics in the UK comes from the IDS 'Pay and Conditions in Call Centres' 1998. The figure is put at around 150,000, but emphasis is made by the authors that there is a certain amount of conjecture around this as figures are maintained by development agencies in Scotland, Wales and Northern Ireland but not England or for London.

Driving factors:
- There has been some Government endorsement of teleworking, notably in 1997 and 1998 through "National Car-Free Weeks". The Government as an employer has for many years taken a supportive line on teleworking, leaving it to individual Departments of State and often to local management to determine the use or otherwise of home-based teleworking by civil servants.
- Overall, UK enterprises have tended to take a relaxed rather than a formalised view of telework; for this reason it is thought there are more people teleworking through informal agreement between managers and staffs than in formal schemes. Informal teleworking appears to work well in the case of professional salaried employees and reflects the trend towards empowerment rather than supervision as a management style.

Sedgwick

A new teleworking project at insurance brokers Sedgwick could in the long term create the opportunity for up to a third of its 700 Norwich based staff to work from home.

A pilot programme involving around 30 teleworkers is the next stage for the company, who employ 4,500 people in total in the UK and 15,000 world-wide. The scheme is currently held back until millennium compliance of the firm's computer systems has been fully completed later this year.

The Sedgwick Agreement in Brief: all teleworkers are notified by letter of the following :

1. variation to existing terms and conditions
2. commencement/duration
3. place of work (the home is defined as well as the office)
4. equipment - this can only be used for home use
5. confidentiality - this is a reinforcing clause
6. luncheon - Sedgwick supply a free lunch to employees but only if you come into the office !
7. other expenses - only the telephone bill is refunded
8. work area - the work area is nominated for health and safety reasons
9. mortgage and insurance - mortgagor should be notified, equipment if covered on employee's household insurance and Sedgwick's insurers are notified for employers liability purposes.
10. notice period for termination of the agreement defined (at one month either side)

- Travel to work is becoming increasingly unattractive for many commuters. Roads are congested and recent announcements suggest a reduction rather than an increase in road building. Public transport is very variable in standards and rail services have come under increasing criticism for overcrowding, late running

and cancelled services. The government is discussing the introduction of some road pricing measures and possibly workplace car parking taxes. All these factors will increase attention on telework as an alternative to commuting and other business travel.

▪ UK enterprises are rapidly taking up telecommunications-based alternatives to both face to face and postal selling and support methods, with a large number of call centres, many companies employing linkline phone numbers, banks and some supermarket chains are starting to offer services on the Internet. BT's more positive approach to marketing ISDN to consumers, together with continued growth in Internet use, will accelerate this trend.

▪ The UK has also the highest penetration of Internet use in the major economies, and further dramatic Internet growth has been experienced in early 1999 with retail groups (from Dixons through to Tescos) offering 'free' Internet access**.** Approaching one million subscribers have now signed up to the Dixons Freeserve Internet in its first few months since launch. The company makes some income from the phone charges split with telecom provider Energis, but hopes to make the major income from subscribers coming through the Dixons on-line 'shop-window' advertising first, before moving on into the net. A number of companies now offer these free services, but users should be aware that support services to help resolve set up problems can be expensive - being charged at up to £1 per minute.

Constraints:
▪ Even in the relatively liberalised UK social and economic environment, the TCA continues to identify fiscal and regulatory issues as significant barriers to the spread of organised teleworking. For employers, there are questions about how Health and Safety responsibilities can be managed when workers are based in their own homes, as well as uncertainties about the tax treatment of allowances or cost reimbursement. For employees there are concerns that the use of one's home as a place of work could lead to punitive local taxes if part of the premises are regarded as being for business as opposed to domestic use. These issues are exacerbated by the fact that many of them are dealt with by local authorities who may not interpret national laws and guidance in consistent ways; an employer cannot be expected to negotiate with many different local authorities where his commuting employees live before embarking on a telework programme.

▪ Corporate culture and management concerns also continue to feature as barriers to organised telework schemes, though these constraints are reducing as more managers become familiar with the technologies (for example email), as more people have their own PC at home or a company laptop, and as technology costs continue to fall relative to commuting and premises costs.

Teleworkers to the rescue

Fit teleworkers could be supplementing their income and doing their bit for the local community by enlisting as part time fire-fighters. A recent review of the needs of the North Yorkshire brigade has led them to focus on people based at home to solve staff shortages. "People who work from home are particularly useful as retained fire-fighters, as they need to be able to reach the fire station within 5 minutes in order to turn an appliance out," said Julie Toward from North Yorkshire Fire and Rescue service. "On the whole retained fire-fighters need to be available during day time hours Monday to Friday in order to provide enough cover to crew an appliance."

The national fire service relies heavily on retained or part time fire fighters, with around half the force made up by retained personnel. Often the problem is that in dormitory areas people are not available as they commute beyond the catchment area. A spokesman from the national Fire Officers Association said : "Some areas are trying different recruitment methods. It makes sense to recruit homeworkers"

▪ Another important constraint on growth is the practical matter of suitable accommodation. For many of today's commuters it's not feasible to switch to home based working; houses are too small, there are two or more workers in each home, and there are social objections - many people see work as a break from home and home as a break from work. Significant investment in infrastructure in the form of flexible working centres, distributed offices, etc., would be needed to allow teleworking to replace commuting on a mass scale.

▪ The trend for work to increasingly rely on computers and telecommunications both drives the opportunities for teleworking and raises some problems - notably the issue of technical support to widely distributed

employees. Technological solutions should be forthcoming, but this also generates opportunities for new kinds of services targeting teleworkers and their employers.

Telework activities and results

- The UK has a very well established telework association, TCA. Originally the TeleCottages Association, it changed its name in 1997, becoming the Telework, Telecottage and Telecentre Association. This reflects increasing attention to employed teleworking and the potential role of shared telecentre facilities. TCA answers upwards of 5,000 calls a year from employers, the media and would-be teleworkers and has considerably influenced the development of teleworking.

- Also in 1997 TCA joined forces with other telework organisations to form a national Telework Platform, which (inter alia) lobbies Government.

- There is an annual conference, held in London during European Telework Week. An Internet Newsgroup (uk.business.telework) has replaced the UK telework discussion list formerly run at the Mailbase site.

- The Transport white paper (1999), "A New Deal for Transport - Better for Everyone", was seen by many as a golden opportunity for the government to embrace IT substitution for transport. As unlikely bedfellows as the motorists organisation the RAC and the Environmental Transport Association (as well as the TCA) put in submissions making this point. The result was a rather equivocal paragraph which suggests that the UK government has yet to do some thorough research to determine what the longer term patterns might be.

- In "Teleworking and Local Government: assessing the costs and benefits", author Ursula Huws starts from the recognition that teleworking is an issue which impacts on local government in a variety of different ways. It assesses the costs and benefits of teleworking to a local authority in its capacity as an employer, as a deliverer of front-line services to local communities, as a planning authority, as a provider of education and training and as an agent of local economic development.

- The report "Working Anywhere (UK DTI -- Department of Trade and Industry) was launched in Telework Week 1998 by the (then) Minister Barbara Roche and marked something of a re-awakened interest in teleworking from the DTI. It follows on the heels of the excellent Managers Guide to Teleworking from the Department of Employment which is no longer in print.

- The DTI also published "Moving into the Information Age - an International Benchmarking Study" a comparative study of take up of ICTs by UK compared with France, Germany, the US and Japan. The general conclusion is that we lag US and Japan but lead France and Germany in terms of technology use by business.

- The annual Motorola Report gives a new set of survey statistics charting the take up of technology in the UK. British bosses are proving slow to catch up with their employees' enthusiasm for flexible working, according to new research. The 1998 Motorola *The British and Technology* report reveals that while more than a third of the 1,000 employees surveyed would like the opportunity to work from home, nearly half said their employers were ambivalent to the idea - neither encouraging nor discouraging it. A total of 18% said their bosses were dead set against flexible working.

- Nevertheless, working practices do appear to be changing with 29% of those quizzed already working from home to some extent and some 36% saying they would like the opportunity to work at home. This year's report went into teleworking in much greater depth than in previous years.

- According to "Telecommute 2000", the UK workforce travels 78.5 billion miles to get to work and a further 43.8 billion miles whilst on business. And the bill for just car commuting is £13.5 billion. The report makes the case for 'working down the wire rather than down the road', pointing out the social, environmental and business cost of commuting rather than telecommuting.

- In a new report "Teleworking Britain", MITEL argues that it is company policy, not lack of trust, which is slowing down the take up of corporate teleworking. The survey conducted by research firm MORI on behalf of communications industry supplier MITEL, asked about attitudes towards teleworking amongst 465 'knowledge workers' and 150 employers. The employee group was targeted from an original sample of over 6,000 individuals by identifying those who were in occupations that 'could conceivably carry out

their work remotely'. From the group, 65% said that teleworking was held back by lack of company policy, with three quarters of the sample saying that their employers would trust them to telework.

▪ A recent "Pay and Conditions in call Centres" (Incomes Data Services) report shows that call centre growth is flattening out. The research covers 80 companies running 120 call centres employing over 32,000 people, one in five of the entire industry workforce, making it the largest survey of pay, hours and working conditions yet published.

Helplines Network

One of the UK's highest profile charities is planing to set up a team of home-based helpline counsellors. The Multiple Sclerosis (MS) Society believes that using people with experience of the disease themselves considerably improves the quality of advice and help given. Allowing the volunteers to provide the service from home makes it easier for those actually with MS to get involved. "Many people with MS want to get involved but can't get into the office because of mobility difficulties", says Jim Glennon MS Society Helpline Manager.

Conclusions

Attention to the Information Society in the UK is now being further heightened by the creation in early 1999 of a Scottish Parliament and a Welsh National Assembly, both of which are expected to embrace some aspects of "electronic democracy". Telework is expected to grow in a steady rather than a spectacular way; already it is commonplace for professionals in the UK to spend some time at home and some time at the office, often without any formal company scheme or policy. However, many companies now recognise that a more organised approach to telework will bring benefits and the proportion of employers with organised schemes is also expected to grow.

A practical barrier to telework is the proportion of homes that are inappropriate (in terms of space or other constraints) as a place for regular as opposed to occasional working. The benefits of teleworking - especially in traffic congestion - would be more readily attainable if supported by investment in neighbourhood centres.

The UK offers an almost unique European test bed for Information Society policies and take up, including telework, given its political commitment to adopting ICTs, the early liberalisation of the telecoms industry leading to a higher than average use of ICTs in relation to individual spending power and size of GDP, its strong advocacy of labour marker flexibility, and the strength of the culture of individual freedom and responsibility many citizens possess. In some of these respects, the country resembles more the USA than continental Europe, although such comparisons can be easily overplayed. It is the case, however, that the UK can bring to European debate and policy development some unique and highly relevant experiences and viewpoints, as well as in turn learning much from its continental partners.

3.16 Global telework perspective

In the increasingly globalised world economy and society, European telework needs to be seen in its international perspective, particularly given the work re-location affects of ICTs as well as their potential for enabling any company to compete on a global basis. According to telework expert Ursula Huws[23], new information technologies are bringing about major upheavals in the global distribution of employment: 'A modern corporation might source software development from India or Russia, data entry from Jamaica or the Philippines and site call centres in Ireland, New Brunswick or Tasmania.'

A new international division of labour is emerging in tele-mediated information processing work with different countries playing unique roles in the new industrial geography, as Europe and other world regions progress towards a knowledge-based economy. Particular countries attract particular kinds of telework: call centres,

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[23] in the 1999 book *Teleworking and Globalisation*: http://www.employment-studies.co.uk/press/9910.htm. Some of the text of this sub-section is taken from this press release. The book provides a new framework for analysing the global affects of telework.

relocated back-offices, software development, data entry, etc. Countries with a good supply of software specialists and with comparatively low wages are strong in the market as destination countries for software development (e.g. Russia, Bulgaria, Romania, Philippines, China, Indonesia and Brazil). Those which offer the lowest wages however, will always attract the attention of low skill data processing. And such work can always be kept moving, to find the cheapest source of labour.

When it comes to attracting tele-mediated work, even language is not always a precondition; one Chinese data entry facility has been reported as more reliable and half the price of US low-skill sources, even though the operators are only familiar with the English alphabet, not the language. Call centres are different, and fluency in English, French or Spanish, for example is important. But here other factors also come into play. Denmark and the Netherlands are in the market for English, and Greece for French, because these are common second languages, whereas former British or French colonies may not have sufficient people with fluency in those languages, or may lack the quality of infrastructure to support a large call centre.

Apart from the state of development of telecommunications infrastructure, other non-human factors are also important, such as the cost to the user of non-dedicated lines. Time zone also matters, when companies are trying to keep call centres, software development, or data entry running 24 hours around the world. The rapid movement of whole classes of work can radically boost a nation's economy, or drain it. There are new winners and new losers. A country riding the wave may suddenly be left behind again as the work moves on. Moreover, these developments are becoming harder to predict because of a lack of indicators to track them. Traditional measures, such as occupational and sectoral classifications, and definitions of 'organisation' or 'export' have lost meaning, and new occupations and ways of working have not been universally defined.

In the following three sub-sections, the status of telework in three world regions, crucial to Europe's future expansion and competitive and trading position, is assessed.

3.16.1 Telework in CEE

It is now almost 10 years since the fall of the Berlin Wall and the revolutionary movements which dramatically altered the societies and economies of Central and Eastern Europe (CEE). Some of the countries involved now stand on the threshold of European Union membership, with most of the remaining eager to join them as soon as possible. Tremendous political, social and economic strides have since been made and, although these are extremely variable from country to country and still significantly behind EU Member States on most metrics, they are resulting in rapid advances in Information Society development.

As in the European Union, data on telework is extremely difficult to obtain, although metrics on the underlying ICTs infrastructure are now becoming standardised.[24] Recent data from RIPE Statistics gives the following picture about numbers of computers connected to the Internet.

Country	Number of computers connected to the Internet, June 1999	per 1000 population
Belarus	1.191	0,12
Bulgaria	14.913	1,75
Czech Republic	102.461	9,95
Estonia	27.087	18,06
Hungary	87.895	8,62
Latvia	15.749	6,30

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[24] For example, from the European Information Technology Observatory 1999, available from http://www.eto.org.uk/eito

Lithuania	11.718	3,17
Poland	162.437	4,15
Romania	30.104	1,33
Russia	191.363	1,29
Slovakia	26.268	4,86
Slovenia	22.506	11,25
Ukraine	23.520	0,45
Finland (EU highest)	492.513	96,57
Greece (EU lowest)	61,511	5,80

Telework is generally not well developed in CEE, except among a well-paid, highly educated and technologically advanced elite, and arguably stands in a similar position as obtained in Western Europe 5 to 10 years ago. But this does not mean that CEE will necessarily follow the same telework and Information Society development path as experienced in the EU's Member States. Firstly, developments are taking place increasingly rapidly enabling bolder and more innovative groups and regions to leap-frog in terms of technology, management and human resource development. Secondly, CEE already possesses many advantages for certain types of de-located work given its long tradition of high educational standards particularly in technical areas, technological infrastructures which, although by no means yet up to the advanced countries' standards in terms of accessibility, cost or quality, do nevertheless provide basic coverage, and a skilled and motivated workforce with generally low wage costs. Thus, CEE is already exploiting some of these in terms of back-office, data entry and software development work. For example, an innovative Bulgarian company is assisting the ETO web-site team develop its web resources database and other online facilities to a high professional standard. Indeed, the majority of CEE countries are now working with the ETO hub web-site by building their own national and regional services. The status of telework in some of the main CEE countries is illustrated in the following brief sketches.

Czech Republic
No specific reports are known of teleworking in the Czech Republic but a small telephone survey asked 100 of the top companies and some sub-contractors about current practice, possibilities and future intentions. Generally the term 'telework' is not understood by Personnel Departments. Of the 18 positive answers received, 7 were from IT/software companies. One, the Czech TV stations, reported having 100 journalists who regularly telework. IBM and Microsoft require staff to seek permission to telework. The forms of teleworking involved include homeworking, working from satellite offices, call centres and mobile work. The extent of teleworking was, however, felt to be greater than reported. The expression telework translates as 'calfworker' in Czech, which may help explain some difficulties in understanding.[25]

A 1998 Internet user survey in the Czech Republic[26], showed that a typical Internet user can be described as a young man with right wing political preferences who is finishing or just finished college or university with a technical orientation. He usually works in a large urban area and in organisations dealing with IT or services. He uses Internet 1-2 hours a day (especially WWW and E-mail) - mostly at his place of work. The major motivation for using the Internet is retrieving information for both personal and work needs, for further education and for communication. Experience with buying online is still rare (but continuing to increase), and results show a significant interest in future use. The major barrier in buying online is often absence of payment cards and fear of transaction fraud. On-line purchasing of travel/admission tickets, books, software and video/audio products is the most common.

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[25] This paragraph taken from an overview of the Czech Republic by Vladimir Smolka in the draft report on *Transborder Teleworking*, the European Foundation for the Improvement of Living and Working Conditions, Dublin, Ireland, 1999.

[26] http://vip.fce.vutbr.cz/pruzkum/e/round4.htm

Hungary[27]

Telework has become of increasing interest to the Hungarian Government over the last few years. It is seen as a way of increasing the number of new jobs available and hence a means for employment creation. In 1998, a budget of 400m Hungarian florins was targeted for telework at two groups: the disabled and mothers of young children, and, as a result 200 to 300 new jobs were created. This low number was the result of the Government only meeting the cost of the equipment, the fact that employers had to pay a large 'deposit' to the Government to be part of the scheme, and because entrepreneurs are not generally seeking to employ people from either target group. However, non-profit organisations welcomed the equipment grant as they anyway aim to employ the disabled.

Lessons have been learnt from this, and other initiatives, concerning key socio-economic constraints, such as the large number of flats which are too small to accommodate work (few people having a separate room or space to designate as a work area), and there is a lack of information concerning where unemployment rates are the highest and therefore targeting was not possible. Technical constraints include the difficulties of on-line work and e-mail connectivity and the high cost of telecoms. In addition, employers prefer staff to be full time rather than part-time/job sharing, many people have several jobs including work in the black economy and control is seen as problematic, many SMEs prefer staff to be self-employed because it reduces labour costs, and contract staff have to be officially licensed but then carry on working in the company's location. There are not felt to be any legal barriers to teleworking.

The extent of teleworking in Hungary is difficult to establish, both because of definition problems and because many do not recognise that ICTs have changed their way of working to include telework. However, as many as 25,000 people may do some work at home using a PC out of a total labour force of 3.5 million. It is likely that most of this work is done by men in occupations such as accounting, translation, typing/editing, research, planning and design. Many would be classed as 'voluntary' teleworkers, but they have probably accepted this form of work because of limited employment prospects rather than out of choice. Looking to the future of telework in Hungary, several factors are important, including the fact that computing skills now form part of formal education so young people will soon be entering the labour market with the necessary skills. However, foreign computer companies funding start-ups in Hungary send young people to UK, Germany and other countries for training and they are often attracted to remain. Employers need to cut production costs and will continue to seek least cost solutions.

Poland[28]

In Poland it is difficult to get information about teleworking practice partly due to a definitional problem but also because of secrecy. However, self-employment is growing particularly as the result of the pressure on small companies to reduce costs. The self-employed sector provides work such as information service providers, e.g. receptionists and telephonists; telephone-based services, e.g. legal; editing and translation; and accounting. Some of these areas are attractive to disabled people and mothers of young children.

The actual wage cost is not the main driver. The cost of creating a workplace in an office is greater than the costs of equipping a home-worker. To counter this, in order to telework the employee must be very reliable as it is more difficult to control remote workers and they are not seen as being as reliable as those physically at the workplace. Being paid for task completion, rather than by the hour can, however, help to control costs. In addition, there are strong incentives for SMEs to use self-employed contract staff, but the costs of telecoms are high and the quality is variable.

The Trade Unions are concerned about the lack of social protection for teleworkers, as they only represent those in employment. High unemployment, however, leads many people to accept self-employment as contract

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[27] From an overview of Hungary by Ildiko Ekes in the draft report on *Transborder Teleworking (op cit.*)

[28] From an overview of Poland by Andrvej Maciejzcvk in the draft report on *Transborder Teleworking (op cit.*)

staff in order to secure work. For the software industry there is concern about IPR when self-employed contract workers carry out the development.

Romania[29]

In Romania the development of a communications infrastructure and the take up of ICTs is in an emergent phase. Most of the population live in apartments with severe space problems and poor telecommunication facilities. The prices of computers and telephone tariffs are also relatively high for widespread tele-homeworking. Many see a great potential for telework centres in order to get over these restrictions.

The Internet market is, however, in expansion: almost 8 million US$ in 1997 and forecast to rise to 42 million US$ by 2001. The estimate of potential teleworkers is now about 0.5 to 1% of the workforce, and over the next five years this could rise to over 3%. In 1998, the Government launched the *National Strategy for Informatisation and Fast Implementation of the Information Society*, in order to build the Information Society in Romania and prepare for joining the European Union. This is based upon a series of short, medium and long term objectives up until 2005, and aims to develop the national information infrastructure, the ICT industry (especially software) and human and institutional resources.

Slovenia[30]

Whilst newspapers have reported instances of 'high tech' teleworking, the evidence is very limited. Amongst those with a higher education, the penetration of PCs is high (75%), 75% have access to the Internet from home, and as many as 5-6% work at home. Technology is not seen as a barrier to development but rather the gap in technological competence between the young and old, urban and rural, educated and less-well educated. Under the current labour code, which has been in place for a considerable time, telework is treated as homeworking and not covered.

Telework is resisted by many managers who are unhappy with the concept due to perceived loss of control and low trust of teleworkers. Computers are being used in conventional employment to control outputs and non-performance leads to dismissal. Greater protection for teleworkers is an issue as is the extent to which teleworkers are really self-employed, rather than quasi self-employment without the legal protection of the employee.

3.16.2 Telework in the USA

The USA is still the leading telework nation as far as numbers of teleworkers are concerned. The take up of many ICTs in the USA is considerably in advance of most other countries and the lightly regulated labour market and highly developed entrepreneurial spirit all contribute to this position.

According to new research based on IDC's 1999 U.S.Residential Telecommunications Survey in 1999[31], 27.4% of all U.S. households reported conducting work from home in some capacity, either as telecommuters, corporate after-hours workers, or home-based business operators. "Each of these segments requires a set of unique communications services and has different financial resources," said Dana Thorat, research analyst with IDC's Residential Telecommunications Services program. "The corporate after-hours segment may seek extensions of sophisticated corporate communications services to extend their work day at home, while home-based business operators want to look more professional and not appear as though they operate a business out of their basement." Some employers may fund all or part of the communications expenses of after-hours households and telecommuters, while home-based business owners often keep a steady eye on their bottom lines when purchasing communications products and services.

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[29] Contributed by Adrian Toia.

[30] From an overview of Slovenia by Franc Treek in the draft report on *Transborder Teleworking (op cit.)*

[31] Based on a telephone interview survey of 1,500 households in February and March 1999. Full results available from Dana Thorat: dthorat@idc.com

The IDC survey also showed that, PC penetration and Internet access tend to be higher among work-at-home households when compared with average US households. IDC's survey of a sample of US households shows in 1999 slightly more than one-half of all households own a PC. Also, online penetration among U'S households has risen to 30% - up from 25.5% last year. "Clearly, consumers are clamouring to get online, and right now the PC is the primary access device," said Amy Harris, research analyst with IDC's Residential Telecommunications Services program.

As far as the number of telecommuters in the US is concerned, this rose to 15.7 million as of mid-year 1998, according to research conducted by Cyber Dialogue, a New York based research and consulting firm[32]. These data are also close to the current forecast made by US-based Jack Nilles, often referred to as the *Father of Telework*[33] Telecommuting is defined as working at home for an outside employer during normal business hours a minimum of one day per month or more. The findings are based on interviews with 2,000 Americans 18 years of age and older completed in July. According to the authors the findings indicate that telework is a very dynamic trend closely related to the level of employment in the economy and the growing impact of computers and the Internet. These data show that while the telecommuter growth trend has fluctuated somewhat during the 1990s, the number of telecommuters who use PCs and go online from home has risen steadily. The research also showed that the Internet is helping to fundamentally transform how workers connect to employers, giving rise to new workstyle relationships such as small businesses that rely heavily on skilled teleworkers to meet productivity needs when the economy is strong.

The Cyber Dialogue research identified three categories of telecommuters: full-time employees, contract workers and part-time employees who telecommute informally. Full-time employees who telecommute now total 7.4 million workers. These employees work from home an average of 18.0 hours per week at home, or about 2.5 days per week. Almost half are employed by small businesses with less than 100 employees, while 1.8 million (24%) work for large companies with 1,000 or more employees.

Over 90% of the 4.0 million contract-based telecommuters report that they work for companies with fewer than 100 employees. None reported working for large companies with 1,000 or more employees. The large segment of 4.3 million part-time workers who telecommute informally were found to be comprised largely of retirees and homemakers who are capitalising on the full-employment economy to supplement income via home-based work. Almost three out of four of this segment are women, by far the highest ratio of the three telecommuting segments. This group was found to be very low-tech and much more a reflection of the strong economy than of PC and Internet adoption.

Demographically, telecommuters in 1998 are around 42 years of age, slightly more likely to be female (51%) than male, and they report median household income of $45,200. Full-time employees tend to be more male (57%) and slightly younger, and earn more ($49,500) . Contract telecommuters are also more male (58%) and earn $46,700 per year, while part-time employees who telecommute informally are somewhat older and earn less ($34,500).

The long-term telecommuting trend indicates that as many as 18 million US adults could telecommute by the year 2000, depending on the overall level of employment in the economy at that time. A strong economy could lead to more telecommuting, but most telecommuters will work at home only part of the time, consistent with the pattern that has long been observed in US national surveys of the trend.

3.16.3 Telework in Japan

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[32] http://www.cyberdialogue.com/press/releases/telecommuting.html

[33] http://www.jala.com/ustcforecast.htm

Telework in Japan dates from a string of satellite office and resort office experiments in the late1980s, although a technology trial on remote working by NEC in 1984 is often cited as the first foray in this area. Born of the economic bubble, the first round of satellite and resort offices were characterised by expensive facilities and technological gadgets, but very little attention was paid to the work processes and human resource issues raised by telework. At this point in time, only the corporate sector showed an interest in telework facilities, there being almost no involvement at the public policy level. With the downturn in the economy at the beginning of the 1990s, corporate interest also took a nosedive, resulting in the closure of many satellite offices, which at the time centred mainly on suburban Tokyo and numbered around a dozen sites.

Since 1995, however, there has been a resurgence in interest in the telework concept in Japan on both the part of the government and the private sector. This interest coincided with huge growth in the domestic computer market, 1995 being the year when Windows 95 hit the Japanese market, 1996 when Internet hosts and accounts skyrocketed and 1997 being touted as the year of multi-media and SoHos. The private sector has taken a renewed interest in telework driven by both a growing awareness of the importance of ICT in a highly competitive global economy and by the pressing management need to reengineer corporate workstyles and business processes. Japanese companies are beginning to rethink their approach to how they hire, compensate, evaluate and compete in today's turbulent labour and business market. In contrast to the initial wave of joint satellite office and resort office pilots aimed at commute reduction, office cost reduction, and new business development, today sees a growing emphasis on in-house efforts and changing employment patterns.

According to Wendy Spinks[34], the major challenge is, therefore, for Japanese management to learn how to manage diversity. The future of Japanese telework rests on this and despite all the socio-economic trends which reinforce the appropriateness of telework as one part of the employment/business solution, corporate telework will remain a marginal work practice until Japanese companies become more comfortable with diversity. Accordingly, the frontrunners are indeed likely to be the self-employed individual, the SoHo entrepreneur and small and medium-sized enterprises (SMEs).

While no single definition of telework holds sway in Japan, a common generic definition is that it is a new workstyle that uses ICT to perform work at alternative work sites. In their *Telework White Paper* (1998), the Satellite Office Association of Japan have classified teleworking in terms of types of worker, facilities used, geographical areas affected, and frequency.

Although no regular surveys of telework have taken place, the Association made an assessment in 1997 of the number of white collar employees teleworking. This found that, as of 1996, the number of full-time, white-collar teleworkers was 809,000 (5.0% of full-time white-collar workers), of which 680,000 (4.2%) were found to be regular teleworkers. Prognoses were also made up to the year 2001 which indicates that in 1999 about 2.09 million (7.9%) would be teleworking, a higher figure compared to Europe though not compared with the USA. It can be expected that if non white collar employees, part-time employees and free lancers were included then these figures would rise.

There have been four main developments in Japanese teleworking over the last year.

1. The Ministry of Posts & Telecommunications (MPT) conducted its 5th National Telework Day on June 14 1999. These days are held semi-annually and are usually conducted in May/June and October/November. The first was held in May 1997. Aimed at raising awareness of telework in Japan, the main activity is a half-day conference highlighting major telework issues and reporting on specific telework cases. This year, the event was addressed by the Minister of Posts & Telecommunications, Seiko Noda.

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[34] More general information on telework in Japan, particularly relating to the 4th International Workshop on Telework, can also be obtained from Wendy Spinks: spinks@jiu.ac.jp. Wendy Spinks provided text for this sub-section.

Unusual in Japanese political circles, Minister Noda is not only female, but only 38 years old. Since taking up her post, she has worked to ensure that network applications, including telework, are placed firmly on the MPT agenda[35]. Another speaker was Professor Keiko Kiyohara, in charge of the work-related research on a telework pilot being conducted at the Science City of Keihanna, not far from Tokyo.

2. A second development which augurs well for Japanese telework is the establishment of an academic association dedicated to telework: the Japan Telework Society (J@TS). Inaugurated on June 5 1999, Professor Takashi Ohnishi of the University of Tokyo was chosen as the inaugural head by some 130 participants. The Society was launched with a one-day conference where some 20 papers on Japanese telework were presented. J@TS intends to establish a journal, conduct regular off-line meetings and flesh out its home page[36], which is currently in its early stages.

3. A third and very recent development is the establishment of an inter-governmental liaison body for telework. Launched on June the 16th 1999, the liaison group will be run by the Ministry of Posts & Telecommunication's Telecommunications Policy Bureau. Senior level officials from a broad range of government ministries and agencies will be involved. The main aim of the group will be to coordinate government policy relating to telework. As such, it is a rare example of cooperation between different branches of the central government.

4. The Japanese Ministry of Labour plans to establish a "Telework Experience & Consulting Centre" (provisional name) under the auspices of the Japanese Ministry of Labour. Set to go into operation in mid-July 1999, this government-funded project will be housed at the Satellite Office Association of Japan (soon to be renamed the Telework Association of Japan) and will offer three main areas of service:
    - a consultation corner where businesses and employees interested in setting up a telework program but not sure how to go about it can visit and discuss with experts from the field. Enquiries can also be made via fax or e-mail
    - an "experience corner" where visitors can see videos on telework case studies and also experience teleworking themselves
    - a separate Home Page that will offer a comprehensive listing or resources and information. This is currently under construction, but updates can be found on the Association's existing home page.[37]

3.17 Major European telework activities in 1998-99

3.17.1 The European Telework Agenda

The European Telework Agenda[38] has been developed to maximise the combined effect of European research efforts together with the support available for structural change (especially through the European Social Fund measures such as the ADAPT Programme), as well as with the impacts of activities related to employment legislation and employment practice. This is quite a unique combination which can only be achieved at the European level and through the institutions in Brussels.

The European Telework Agenda, in addition to bringing together these three instruments of policy implementation, also focuses limited resources upon a small number of events and activities each year in order to maximise the impacts and synergies that can be achieved. Thus, in 1998-99 resources were concentrated on

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[35] The MPT home page is located at: http://www.mpt.go.jp

[36] http://urban1.ues.rcast.u-tokyo.ac.jp/www/telework/cover.htm

[37] http://egg.tokyoweb.or.jp/soajhome/index.htm

[38] http://www.eto.org.uk/agenda

high profile and high impact events at a European level which both reflected the mainstreaming of telework in the working lives of many Europeans and helped to shape these changes.

3.17.2 The Third International Workshop on Telework - Turku, Finland, September 1998

At the 1998 International Workshop on Telework, the third in the series, a new maturity was discernible in the way issues and developments were addressed. This was evident both in the first three days of academic workshops and papers, as well as the final day conference[39].

The theme for the workshop sessions was 'Teleworking Environments', representing the fact that teleworking issues are eclectic and figure highly on a range of agendas - from transport planning and rural regeneration, to business innovation and flexible working. This was reflected in the many angles and disciplinary perspectives from which speakers came at the subject.

The session on the 'Workgroup environment', for instance, sought to address the importance of 'work context' for homeworkers and 'virtual teams'. While acknowledging the flexibility offered by new technologies, the speakers also urged the consideration of how 'tele-presence' can recreate the social networks that are built in traditional workplaces – networks that enable information to be shared, whilst also providing support and advice.

The session on the 'Learning and Development environment' pointed to another example of a more mature approach to telework. It was noted here that organisations often have many issues and problems to deal with, quite apart from those related to teleworking. Moreover, in taking decisions about organisational change and new working practices, many (non-teleworking) alternatives may vie for consideration, such as re-engineering or outsourcing. Whether telework-related options are decided upon may therefore depend on the relative merits of alternative change programmes.

One recent development in flexible working that has attracted much attention is that of mobile work. For many people, the use of technologies such as mobile telephony, and laptop computers with modems and e-mail, are characteristic of an emerging form of telework. Data presented at Turku illustrated that, indeed, mobile working may be growing faster than traditional home or centre based teleworking. But an even more interesting point was raised by studies in Norway. Here, research also shows that mobile working and homeworking may be mutually reinforcing – in other words, the more people adopt mobile working, the more likely they are to undertake home-based working too (and vice versa).

For many workers in the future, the most effective kind of flexible working may therefore involve a balance between working at home, at the office and out and about visiting clients, suppliers and other business partners. Recognising the way forms of telework may complement each other – as well as onsite work – represents a further advance in a debate often preoccupied with simple issues of substitution of technology for travel.

As with the Amsterdam event the year before, Turku 98 ended with a final day conference, attended by additional participants – mostly from industry. Keynote addresses were made by Finnish Labour Minister, Liisa Jaakonsaari, and – by video conference – Swedish Labour Minister, Ulrika Messing. The common political message here was that teleworking is set to play an increasingly important role in providing individuals and businesses with flexibility. As Minister Messing put it: 'teleworking is not an end in itself.' Knowing the value of teleworking to businesses and individuals alike, will be the key to its development.

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[39] A summary of outcomes from the four days can be found at www.tukkk.fi/telework.

3.17.3 The Fifth European Assembly on Telework and New Ways of Working – Lisbon, September 1998

Telework 98 took place in Lisbon, 23 to 25 September 1998 and was organised by APDT (the Portuguese Association for the Development of Telework), with Portugal Telecom as principal sponsor. Other sponsors included the European Commission, Sun Microsystems, ICP (Portuguese Telecoms Regulator), IEFP (Portuguese Government body for Employment and Professional Training). Cisco, and Delloite. TMN (Portugal Telecom GSM operator) sponsored specific panel sessions.[40]

Telework 98 was the biggest international event on telework ever held in Europe and probably in the world. More than 500 people from 23 different countries attended the event, slightly more than half coming from Portugal. Scandinavia, Italy and Spain, together with Portugal, accounted for more than 75% of all attendees.

Media coverage in Portuguese-speaking countries was outstanding. The two main TV networks in Portugal, SIC and RTP, provided a comprehensive overview of the event, and the latter interviewed the Organising Committee live on one of the prime-time news services. Rede Globo (GNT), the main Brazilian network, also had a team on the spot. And all leading general news and economic newspapers in Portugal covered the event.

After listening to more than 60 speakers, the Assembly's main conclusion was that telework is now seen as a major horizontal intervention tool capable of shaping all economic domains. It was found that the true innovation enabled by telework is the conceptual attitude behind it, driven forward by recent advances in telecommunications and information technologies. Various examples of remote work using traditional technologies were also referred to.

Five main areas were addressed at the Assembly, as one-day panels taking place in parallel:

1. **Employment**
In this panel, "Towards a new work society", four main themes were discussed:
i)   new employment opportunities provided by telework and the new ways of working introduced by the Information Society, focussing on their implications for human resource management
ii) the legal and contractual framework of tele-activity -- here, the main conclusions suggested that new regulations are not always needed to cover telework
iii) the role of social dialogue in the development of telework
iv) new future outlooks for telework, presented within the global context of a discussion about the transition to a new work society.

2. **Tele-medicine**
In addition to explanation of the basic concepts of tele-medicine, generic aspects such as planning and management of tele-medicine in a hospital were presented. Special focus was given to issues like medical tele-

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[40] http://www.teleman.pt/telework98

training, tele-monitoring of medical signs (ECG, blood pressure, pulse, etc), tele-consultation and tele-diagnosis. Other specific aspects covered were the use of smart cards by patients, and of electronic devices like databases and medical libraries in medical schools.

3. **People with Special Needs**

Telework can improve the autonomy and personal development of different types of special-need persons: the unemployed, prisoners, the elderly, disabled people and those living in remote locations. ICTs can indeed reverse the process of exclusion of these groups. Cases of the successful implementation of networks of centres and clubs for the elderly were described. There was detailed reference to tele-learning as a means to integrate disabled or seriously ill children and adolescents .

4. **The Technological Framework**

The main conclusions of this session were that successful telework usage implies setting up adequate technological infrastructures as well as good organisation and management procedures. It was shown that virtual corporations are becoming a reality and that the Internet is an important catalyst in the current change of paradigm. Porter's Value Chain concept, launched in the 1980s, now gains new relevance with the advancement of ideas such as the extranet. Tools of vital importance for establishing secure electronic commerce were debated, namely the recent initiative led by VISA of establishing the SET protocol for electronic transactions. Several home office layouts were also presented in this panel

5. **New Organisations**

The characteristics of teleworking enterprises were summed up as:

- *fast*: telework accelerates product life and its introduction onto the market, and allows direct interaction with clients
- *flat*: in contrast to hierarchical structures
- *flexible*: the flexibility of telework reduces costs while improving workers' morale and their interaction. Many tasks can be done either at the office or at home, or in fact anyway with access to the network.
- *fair*: for example, open and transparent with opportunities for all
- *free*: free to innovate, develop, seek new markets, and develop new products and services, freed from constraints of time, space and convention.

3.17.4 European Telework Week 1998, November 1998

European Telework Week is the focal point of many activities that go on throughout the year promoting the understanding of telework and its considered implementation. There are many other activities that seek to attract the attention of the public and the media alike, and a focusing of telework actions into a single week enables participants to reinforce their message at several levels. It was to support industry, administrations, and other interested organisations in their activities that DGXIII launched the first European Telework Week in 1995.

ETW'98 ran from the 2 to 9 November 1998. This fourth year of ETW was a success with more than 150 events being held across Europe, with 70 major ones in 11 countries. Estimated direct attendance was over

13,000 people (13,470). Over 50,000 European Telework Week newsletters were published in 3 issues, in 4 languages (English, French, German and Italian).

As a media event, Telework Week 98 and telework in general was brought to the attention of 20 to 30 million Europeans, through a range of European newspapers, magazines and business press, as well as radio and TV activities (around 180 press releases, radio and TV activities, including BBC World Radio, RAI, etc.). Over 500 articles and press references were recorded as a result, with at least the same number not monitored. There were also reports in the US media about European Telework Week. This year saw a special interaction with Canada that held its first national telework day (the 4th of November) during ETW.

The second European Telework Awards Ceremony was organised in Brussels on 6 November 1998 as part of ETW. Seven categories were represented and more than 150 representatives from the economic, social, political and academic spheres attended the Ceremony. The event was web-cast and over 2,000 people (2,406) voted via Internet to share their votes with an expert jury and with the representatives present at the Ceremony to elect the winners.

European Telework Week 1998 was supported by organisers and sponsors all over Europe. The framework for co-operation and the European Telework Awards contest were made possible by the European Commission DG XIII and its Core Partners: Toshiba, France Telecom, Cisco, Telecom Italia and Siemens. Toshiba participated in 1998 for the second time. In The Netherlands Toshiba is also one of the founding members of the Netherlands Telework Forum (NTF) and has as such already been involved in the Dutch activities around telework promotion for a long time. Promotional activities included a campaign focused on the slogan "So how do *you* get to work", as early as 1996.

Core partners for Telework Week in 1998 were:

France Telecom is equally involved in the activities of the French Telework Association. Although a first time core partner, France Telecom has actively participated in earlier Telework Weeks by sponsoring events and issuing a special edition of one million telephone cards.

CISCO is a new partner. Despite the company's long standing reputation as an Internet and network specialist for their dominant role in IP routers and Internet nodes, few Europeans know what CISCO stands for. Telework Week will contribute to a wider understanding of their role and products as important contributors to building the Information Society.

Telecom Italia has helped to put telework on the agenda in Italy. As a major national organiser and sponsor in 1997, Telecom Italia decided to participate as European Core partner in 1998, next to providing a full framework for telework activities in Italy, working in close collaboration with Italian telework experts and in particular with ETD.

SIEMENS also participated in European Telework Week, for the second time as core partner. SIEMEN'S interests were directly represented by a specific Telework Consulting Group in München.

Telework Week support was channelled and co-ordinated by Martech International and members of the project European Telework Development. Assistance in media contacts was provided by the Pinacle, a pan-European

collaboration between independent PR agencies, and Newsdesk, an Internet-based information desk for journalists, mainly in IT, Internet and Telecommunications

A full report on ETW '98 and the 1998 Telework Awards is provided in Annex 1.[41]

3.17.5 Telework at the Information Society Technologies Conference, Vienna, December 1998

"New Ways of Working" featured strongly at the IST Conference. This event, which is the main annual showcase for Europe's IST Programmes, attracted a capacity crowd of more than 3,000 delegates. Work Nouveau was the title for one of the first sessions of the conference and the session was heavily oversubscribed, with many delegates standing in the conference room and others listening to the presentations relayed outside the room. Additionally, the presentations were seen and heard by a larger audience online through both video links and webcasting.

The session, chaired by Maarten Botterman of the European Commission, DGXIII, started and ended with video clips from the European Telework Awards 1998. Horace Mitchell, Director of European Telework Online and Programme Director, European Telework Development gave the first presentation - *New methods of work in Europe: a snapshot* - focusing on Europe's potential "strength through diversity". David Leevers of BICC explored *Virtual presence: collaborative, integrated communications in the construction sector*, presenting experience from Fourth Framework Programme projects. Hermann Maurer, Chairman of the Institute for Information Processing and Computer-Supported New Media, Austria overviewed current and emerging technologies and experience in *Knowledge management and knowledge transfer: key issues of the information society*. Concluding the session Larry Taylor of TTP Communications presented exciting ideas for the future of mobile communications - *Services nouveau*.

Later on the first day of the conference, Dutch TV news anchorman Victor Deconinck hosted "The Employment Debate" - leading experts on the social, economic and technological aspects of work, meeting in a lively talk-show format. The experts were prompted by interventions from people - workers and decision makers - with real-life experiences, and challenged by opinions from a large and vocal audience. Experts participants included Luc Soete, Professor of International Economics, Maastricht University; Willy Buschak, Confederal Secretary, European Trade Union Federation (ETUC); and Joan Majó, Institut Catalan de Tecnologia, Chair of the Information Society Forum workgroup on "Employment and Jobs". Contributions from the market came from Donald MacDonald, National President, UK Communication Workers Union (CWU); Joop van Putten, Director, NBBS Travel Agency of the Netherlands; Rudi Weissmann, TISS (Travel Information Software Systems) of Germany and John Taylor, AGORA, a former BT employee. Staffan Hildebrand of Sweden presented his film *The Future of Work*.

Throughout the conference the very busy accompanying exhibition showed selected projects of the Fourth Framework Programme, including the *European Telework Online* service. The IST Conference and Exhibition in 1999 will be in Helsinki, 22-24 November 1999.[42]

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[41] see also http://www.etw.org/98

[42] Details of the conferences are at http://www.cordis.lu/ist98 and http://www.ist99.fi.

3.17.6 *European Telework Information Day, Brussels, June 1999*

The European Telework Information Day on 1 June 1999[43] presented the current European Commission's policy, and its information and stimulation activities with regard to telework, and a preview of the European Telework Status Report for 1999.

A very wide range of people having a constructive interest in European telework participated in the Information Day. These included Commission staff involved in telework-related activities, regional activists, European and national project participants with activities related to telework, telework national event co-ordinators from previous years, and other key players including suppliers working at European level, representatives of the social partners, and relevant officials of national organisations.

The first part of the day's proceedings consisted of an update on telework and related activities in Europe mid 1999. This included an introduction to telework and the Commission's support, now and in the future especially focussed upon the new Information Society Technologies Programme and Key Action II concerned with new methods of work and electronic commerce; a view from the Information Society Forum to the development of employment in the context of the emerging information society; a report on social policy developments from DGV, as well as inputs concerning Structural Funds support and the Fifth Framework Programme.

In the afternoon, Telework Week 1999[44] and the call for nominations for the 1999 Telework Awards[45] were announced. This was followed by an overview of technologies enabling telework arising largely out of the work of the Fourth Framework Programme now drawing to an end. Finally, introductions were given to two of the highlight events from the European Telework Agenda taking place in September: the 4th International Telework Workshop being held this year in Tokyo, Japan[46], and the 6th European Telework and New Ways of Working Assembly being held in Aarhus, Denmark.[47]

3.17.7 *European Telework Development – European dissemination activity*

The overall objectives of the European Telework Development (ETD) project, supported by the European Commission's ACTS Programme under the Fourth Framework Programme for Research and Technology Development, are to:
1. broaden the concept and impact of telework in order to also encompass:
   - teletrade/electronic commerce: enterprises trading electronically
   - telecooperation: enterprises, individuals and governments cooperating electronically with each other
2. become a prime agent and facilitator in moving the agenda from research and discussion to action and implementation by:
   - increasing awareness
   - developing understanding
   - promoting appropriate and successful implementation.

Commission support for ETD is terminating in mid 1999 and there are as yet no concrete plans for continuation. However, the web-site and all its associated services (located at http://www.eto.org.uk) will

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[43] A full report on the Information Day, published by the European Commission DGXIII-C, can be downloaded from http://www.eto.org.uk.

[44] http://www.etw.org

[45] http://www.etw.org/awards.htm

[46] http://www.teleworkfoundation.org

[47] http://www.telework99.dk

continue to serve the large number of users in Europe and world wide. Please watch for announcements on this site!

Over ETD's three year life (1996-1999), it has become well established both within the ACTS community and as an important and influential actor in national, European and indeed international telework networks. The project has been very successful as a prime mover in changing the agenda of telework from one of debate to one of action and practice. Outreach has been effected through ETD's national activities programme, the stimulation of activities and support for interest groups including suppliers and user communities, and its on-line services and media campaigns and materials.

The ETO web-site is now receiving upwards of 200,000 hits per month. Many individuals and organisations have contributed to this process, including a large network of volunteers from over 30 countries. ETD has done this by extending the coverage from just telework to include teletrade (encompassing electronic commerce) and telecooperation by showing how telework, as a new way of working and of organising work, cannot be seen in isolation from wider market developments, or as part of the burgeoning demand from employers, organisations and the macro economy for greater efficiency and global reach.

This has taken place whilst the number of European teleworkers has increased from about 2 million in 1996-7 to over 9 million in 1999. Although this is still less than the USA and there remain significant differences between Member States and between types of enterprise, Europe is starting to mainstream telework in many activities where it makes sense to do so from both the organisation's and the individual's point of view.

4 Telework and the European Commission

4.1 European policy framework

For more than five years, the European Commission has actively pursued policies designed to build the Information Society in Europe. Telecommunications liberalisation, together with Social policy, naturally constitute central pillars of these efforts. Creating appropriate conditions for new business, providing continuous support for technology development and pilot projects, and raising public awareness have been others.

The European Commission's first interest in telework dates from 1989. Concerns were raised in the context of the Communication Technology research programme RACE, when assessing risks (of exclusion) and opportunities (for decentralisation) arising from the economic impacts of advanced communications on rural areas and remote regions. The strategic analysis performed by DG XIII in liaison with DG VI (Agriculture), as part of the reform of the Common Agricultural Policy (CAP) identified telework as a potential contributor to broader employment opportunities in rural areas..

These considerations led to the launch of the ORA RTD Programme, with a planned synergy with the LEADER I Structural Funds initiative in support of local and rural employment initiatives. It was in this framework that the first research projects with a focus on telework were launched: PATRA (on social and psychological aspects), MITRE (to explore the "business case" for teleworking), and the consensus and awareness raising project SYNERGY (ECTF).

Starting with the White Paper on *Growth, Competitiveness, Employment, the Challenges and Way Forward into the 21st Century*, launched in 1993, the European Commission set the priorities for the coming years to prepare Europe for a new form of society: the Information Society. The main concern expressed in the White Paper was work. The enormous growth of an army of unemployed in the Union reinforced the need for a new focus. Widespread awareness of telework was stimulated in 1994 by a set of explorative research and stimulation actions initiated by the Commission[48], linking Europe's transition to an Information Society with the need for greater flexibility in employment.

Building on the conviction expressed in the White Paper that "the enormous potential for new services relating to production, consumption, culture and leisure activities will create large numbers of new jobs...", a High Level Group of European industrialists recommended to the Council an Action Plan in order to ensure that new jobs will be created in Europe as rapidly as possible. This Action Plan was first adopted in 1994[49], and identified telework as the first of ten applications to launch the Information Society. It was updated in 1996 as a "Rolling Action Plan"[50], building on the success achieved in liberalisation of the telecommunications sector and in implementing the 4th Framework Programme (1995-98), notably by a large number of support measures for European Research and Technology Development (RTD), especially ACTS (new communications services), ESPRIT (information technology development in the context of changes in business processes), and the Telematics Applications Programme.

The social aspects of telework have been addressed by two Green Papers. First by the Green Paper on *Living and Working in the Information Society: People First*, adopted in mid-1996. The ensuing consultation process showed a somewhat polarised debate, some believing telework should evolve naturally, others arguing

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[48] "Telework 1996: Actions for stimulation of transborder telework and research cooperation in Europe; Final Report", DGXIII B, April 1996 (OPCE: CD-94-96-695-EN-C)

[49] "Europe's way to the information society: An Action Plan", COM(94)347, 19 July 1994

[50] "Europe at the forefront of the Global Information Society: Rolling Action Plan", COM(96)607, 26 November 1996. Available at http://www.ispo.cec.be

that new legislation is needed to protect teleworkers. The follow up to this Green Paper, *The Labour Market and Social Dimension of the Information Society[51]*, also addressed telework and announced, inter alia, the launching of a consultation with the social partners on whether and to what extent Community action on the protection of teleworkers is advisable.

The second Green Paper, on *A Partnership for a New Organisation of Work[52]*, adopted in mid-April 1997, resulted into the Communication *Modernising the organisation of work – a positive approach towards change[53]* and this now dominates the agenda on social policy. A publication *Jobs in the Information Society[54]*, released just before the European Summit in Vienna, underlined that 500,000 Information Society jobs were not being filled because of lack of skilled people in the labour market.

In 1998 the Member States agreed the funding of the Fifth Framework Programme for European Research and Technology development. This brings together for the first time in one Key Action, within the Thematic *Information Society Technologies* Programme (further referred to as: IST), all work related to helping individuals improve the quality of their working lives and helping companies operate more efficiently, as well as in trading goods and services ("*New Methods of Work and Electronic Commerce*").

The 1999 Action Lines related to telework, for which more then 100 project proposals have already been submitted in June 1999, focus upon improving our understanding of changes and new opportunities in ways of working and doing business, together with the development of new technologies, methods and services - for the workplace and for support of teamwork, within and across the boundaries of organisations.

In addition to IST, support for developing telework applications, with a focus on production process innovation, can be found in the calls related to the Key Action "Innovative Products, Processes and Organisation" under Theme 3: "Competitive and Sustainable Growth", and in the joint call for proposals on intelligent manufacturing systems (IMS), particularly under the theme "Human/organisational/social issues".

In order to ensure strong outreach to Europe's citizens, DG XIII, in close collaboration with DG V and other Services of the Commission, developed a European Telework Agenda in 1998 for the first time. The Agenda describes a series of key events spanning the spectrum of telework issues. These include social, technology and policy areas, academic research, and events aimed at telework activists and practitioners. Taken as a whole, the synergy of these complementary events provides a coherent European thrust and character to the new ways of working debate and the development of appropriate technology and services.

4.2   The social and labour market policy context

The annual Employment Guidelines, first adopted by the European Council in November 1997, are incorporated in national employment Action Plans, and implementation reports are updated every year. In the 1999 National implementation reports, Information Society Job Creation Prospects will be addressed at all levels. The specific focus on telework is mainly related to the "Adaptability" pillar in the Action Plan priorities.

The Communication on Work Organisation[6] was adopted in November 1998. The Communication aims to stimulate and strengthen partnerships for the modernisation of work organisation. It suggests a number of issues, which the Commission believes will be helpful for the social partners to address. These issues include:
* facilitating the diversification of working relations as well as new forms of work;
* ensuring optimum conditions for the introduction and uptake of new technologies, particularly information and communication technologies;

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[51] COM(97) 390, 24 July 1997: http:// europa.eu.int/comm/dg05/info_soc/com397/97397en.pdf

[52] COM(97)…, April 1997/ http://www.europa.eu.int

[53] COM(98)592, November 1998 http://europa.eu.int/comm/dg05/soc-dial/labour/com98-592/com359en.pdf

[54] OM(98)590, November 1998 http:// europa.eu.int/comm/dg05/info_soc/jobopps/summen.pdf

- social and labour market policy initiatives with a focus on telework

The rationale of Europe's employment policy is that it is not a policy for unemployment, because the strategy is a positive one, of course to reduce unemployment, but even more important to increase the number of people who participate in the labour market.

Participation rates in the USA and Europe are respectively 72% and 60%, and, if Europe is to come up to the USA level, 30 million extra people would need to be found work. This is a major challenge, and it needs to be approached without abandoning our social model and social welfare system which most people wish to maintain.

In fact, these systems are, expensive and increasing participation in the workforce would be one important way of helping to fund them.
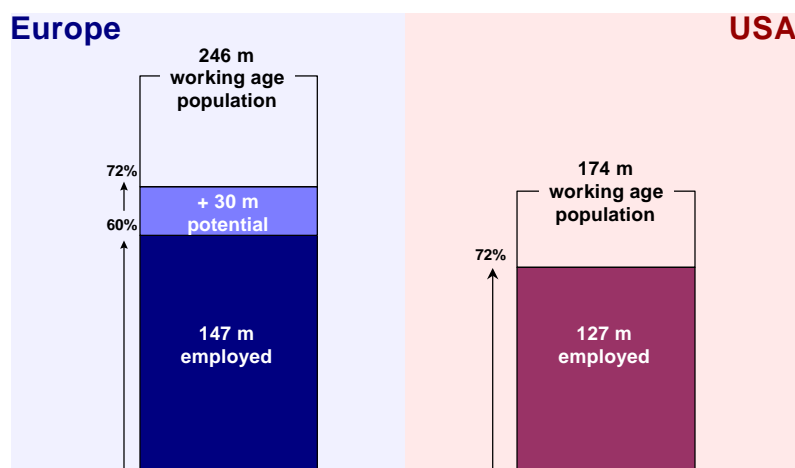
There are two main strands of action in place to tackle these issues:
a) Ensuring a stable macro-economic environment, a key instrument of which was the launch of the Euro to ensure that currencies do not fluctuate within Europe thereby providing a stable background for economic development. This is important as 92% of Europe's trade is internal and the Euro reduces costs to industry by approximately 2%, not unimportant when companies look at their bottom line.
b) The European Employment Strategy itself, launched in Luxembourg in November 1997 at a special Job Summit, is a rolling programme with built-in periodicity. For example, guidelines are normally established in the autumn to which Member States react at the beginning of the following year, leading in turn to new guidelines, in a cyclic adaptation to changing needs and priorities.

The employment process itself is built upon four pillars, which are sufficiently broad to take up the challenges that face us in terms of our labour and employment markets:

1. **Employability**: based upon active rather than passive policies which requires intervention to prevent people becoming unemployed and, even more important, to prevent people becoming long-term unemployed. For the individual, employability means the capability to find a place in the labour market.

To illustrate this there are approximately 18 to 20 million people who become unemployed each year. About 4 million people move each year from being short-term to being long-term unemployed, and, because about the same number of long-term unemployed find jobs, the overall total here does not change much. The objective is therefore to cut the flow from short-term to long-term unemployment, which will mean that the number of long-term unemployed will start to decline. A series of issues are being addressed to Member States to this end. One of these is concerned with using the tools and benefits of the Information Society, i.e. life-long learning, to help retrain everyone for changing economic conditions.

2. **Entrepreneurship**: Europe is severely in arrears here, and it is essential to redress this if we are to grow jobs. In terms of how Europe's labour market and economy is structured, only 30% to 35% of Europe's economy is based on services compared to 60% in the USA.

The world economy is moving more and more towards services leaving Europe seriously in arrears, especially in light of the increasing export of manufacturing jobs to low cost economies.

The problem is compounded because many services can be made available using the new technologies, and we are losing out on the potential job creation which accompanies this. Therefore, there is focus upon a policy framework to optimise the employment potential of the service sector, particularly in an Information Society context.

3. **Adaptability**: this is about coping with change, as individual workers and as enterprises, and goes to the root of the telework discussion. Over the last 30 years in Europe there have been three economic downturns when jobs have been lost, although jobs were gained again in the intervening periods.

Throughout the period, however, employment growth in manufacturing was largely negative compared to a largely positive growth over the whole period in services.

This shows that the new jobs are coming almost entirely in the service sector, and overall job growth takes place when GDP growth is above 2%.

Changes in industry

In million

The underlying problem is one of adaptability which means that each time there has been a down-turn we are not able to make the changes necessary to cope with external shocks, let along the internal challenges coming, for example, from increased competition, new technology, consumer demand, etc.

It is not possible to legislate for adaptability, thus the adaptability pillar is focusing much of its effort on the social partners, because it is companies and workers who need to do the adapting. Agreements need to be established to modernise the organisation of work, including the issue of telework.

Changes in services

In million

Getting people to adapt to telework is the most difficult challenge we face. Coping with changes, new systems, new ways of doing things, is very difficult for most people. For telework as such there are two fundamental problems we face:

a) a competence problem: for example the number of people in Europe capable of using a PC (based on the European Computer Driving License qualification and other estimates) shows that there are no more than about 25 to 30 million out of a labour force of 250 million, i.e. less than 10% of the labour force are competent, and learning how to use the technology is very painful for many. Technology connection is also an issue as we do not have real plug and play yet.

b) telework is seen as a real threat to management in many organisations, and the greatest reluctance we see comes from this group because they feel that they cannot control the teleworker. Many managers find it very difficult to "let go", not just in relation to telework but with all the new forms of work like team work, flat hierarchies, etc., etc. Telework also highlights what it is you actually do in your work in terms of what you produce, your productivity, how this can be measured, etc. This is seen as a threat by many.
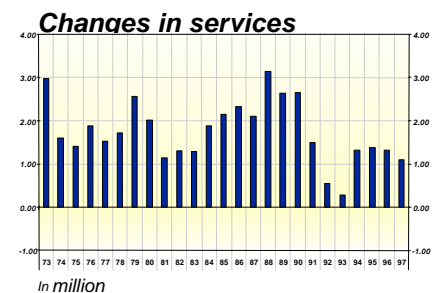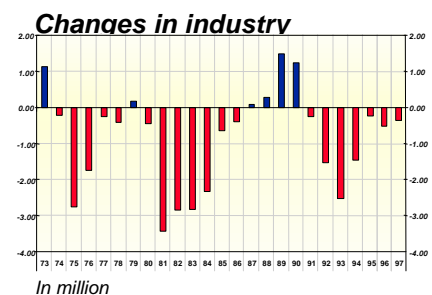
4. **Equal opportunities**: is a high political priority within the employment process. The growth of female participation in the labour market is such that by about 2010-2015 it will be in parity with male rates. Many issues surround this change including the need for sufficient support to enable women to take up work. Thus three guidelines in the employment strategy have been focused on equal opportunities.

The 1999 guidelines were adopted at the European Council in Vienna in December 1998, and each Member State is now updating their National Action Plans (NAPs) which include an implementation and impact assessment of 1998's guidelines. These national assessments and reports are now coming in and being analysed, and the Commission will, over the summer, prepare new guidelines for adoption before the end of the year.

An important innovation this year, arising from discussions by the Heads of Government in Vienna, will be a focus on the Information Society as a special horizontal issue.

The Information Society can be applied in relation to each the four pillars, i.e. life long learning and education in the employability pillar, new jobs in the entrepreneurship pillar, introducing the new technologies into companies and into the way we work in the adaptability pillar, and equal gender distribution in the equal opportunities pillar. These are now integrated in the NAPs and being analysed in the reports coming in.

Two types of actions are important in this context:
1. Member State, policy actions:
   On the basis of a report considered in Vienna, each Member State is looking at their policies for the Information Society in relation to six priority areas::
   i) revitalising the enterprise environment
   ii) developing flexible, robust policy frameworks
   iii) using the public sector to drive the Information Society by way of example
   iv) maximising the potential of Information Society technologies
   v) investing in tools for the job
   vi) investing in employability and adaptability
   Member States are now reporting on these areas to the Commission, and the results will be considered in Helsinki next December. Here it will be important to build upon what is happening in each Member State with the purpose of stretching them by introducing benchmarking indicators in terms of their performance in the areas of infrastructure, the supply of services and the development of the Information Society.

2. Social Partner actions: a Communication was issued at the end of last year addressing the issue of work organisation and which proposed setting up a comprehensive process. One of the difficulties often arising when, for example, considering working time, short term contracts, health and safety legislation, or taxation, is that each of these is processed in isolation without coherence across the whole range of issues which need to be dealt with.

Even though these issues may be dealt with in different ways (e.g. some may require legislation and some not, some need funding, some need common sense, etc.), we need to look at the total set of challenges facing us in terms of new forms of work organisation and modernisation of the work process in a holistic sense.

The key role in this process has been assigned to the social partners so that it is they who develop the framework for action. The importance of work organisation has thus been reinforced at the highest political level, both through this Communication and through the Adaptability Pillar in the employment process.

The issues will be tackled by means of a common set of objectives so everyone can agree where it is we wish to go through an agreed process. We have seen that the convergence process worked well when the Member

States established and launched the Euro, and the same approach is now being used in the employment strategy.

A specific set of issues also need to be agreed and defined, with the Commission proposing but not proscribing some of the following, as the final decisions need to be taken by those involved themselves:

- training
- working time packages
- diversification of working relations
- new technologies
- involvement and participation in the decision-making process as well as financially.

The Commission have requested that the Social Partners develop these, agree the process and report back by the end of 1999.

A so-called "reflective seminar" was held on 9 June 1999 with the Social Partners at both European and national levels where the telework issue was explored in a forward looking way. Given that telework still only affects between 6 and 9 million people this is a good time to look at the experiences we already have before the practice becomes more widespread.

Similarly, it is not envisaged at this point in time that it will be necessary to make any legislative changes, although this may come in the future. There is a clear opportunity here for the Social Partners to take a leadership role in the area of adaptability, modernisation of work organisation and in the area of telework.

4.3 European RTD

For the first time, the Fifth Framework Programme brings together in one Key Action (Key Action II) within the Thematic *Information Society Technologies* Programme (further referred to as: IST) all work related to helping individuals improve the quality of their working lives and helping companies operate more efficiently, as well as in trading goods and services ("*New Methods of Work and Electronic Commerce*").

> *The aim of this work is to develop Information Society technologies to enable European workers and enterprises, in particular SMEs, to increase their competitiveness in the global marketplace, whilst at the same time improving the quality of the individual's working life, through the use of Information Society technologies to provide the flexibility to be free from many existing constraints on both working methods and organisation, including those imposed by distance and time. It covers both the development and the trading of goods and services, in particular in the electronic marketplace, and takes into account the different requirements of the individual worker, consumer and of businesses and organisations, and includes related training. Considerations of the global context, in particular the rapid evolution of the marketplace, and socio-economic factors will guide the work, and the objective will be to develop and demonstrate world-best work and business practices, exploiting European strengths such as electronic payments, smart cards, mobile systems, software for business process modelling and enterprise management and consumer protection.*

The 1999 Action Lines related to telework, for which project proposals can be submitted, are related to improving understanding the changes and new opportunities in ways of working and doing business, together with development of new technologies, methods and services - for the workplace and for support of teamwork, within and across the boundaries of organisations.

In the context of Key Action II, a set of Fourth Framework Programme projects focused on new ways of working has come together to form a cluster focused on New Ways of Working. This cluster will build on the

work of the Telework Chain of the ACTS programme[55] and provide a bridge between the Fourth and Fifth Framework activities. It will be joined by new projects supported within the IST Programme as well as establishing links with other relevant Fifth Framework activities and policy development.[56]

A workshop held in Brussels on 5 May 1999 brought together projects from the ACTS, ESPRIT and Telematics programmes. Presentations by these projects illustrated the wide coverage of telework-related technologies and opportunities in these programmes, including education, training, design, manufacturing, and involving suppliers and users, networks of SMEs working collaboratively and in virtual organisations. These result in shorter time to market, increased product quality, improved productivity and ergonomics and greater exploitation of innovation, many results being available in live demonstrations and trials and some in practical everyday application. Technologies include the use of telepresence and videoconferencing, electronic commerce technologies and practices, and innovative use of websites. Almost all involve ICT toolkits, many of which demonstrate a general convergence in improving personal productivity and industrial environments, and new user interface technologies, including speech and natural language applications that had not previously been feasible. These tools and the evolution of related standards have greatly facilitated the cross-fertilisation between different applications, sectors, disciplines and programmes. A report on the workshop is online.

In the subsequent Telework Information Day (1 June 1999) input from a project in the cluster suggested a new way of assessing the opportunities and requirements for RTD on New Ways of Working in the IST Programme, suggesting differentiation between:

Three different types of research:

- urgent: a clearly known requirement with a valuable outcome but not yet a readily available solution, and needing short but focused work Not enough awareness and dissemination of the results from the 4th Framework Programme has taken place of efforts like this.

- strategic: known or widely expected market opportunities with a relatively clear technology and standards development direction (i.e. a lot of agreement), and available capacity to do it (a good example has been the next generation mobile, UMTS). Probably too much of our previous research has been here compared with the other areas.

- differentiated: stepping back from present trends and taking an innovative perspective by looking for novel solutions to problems which, perhaps, no-one knew existed. There are, of course, dangers here and there is always a need for very strong marketing. Europe has been weakest here and so this needs more attention.

The extent to which the technology is embedded in the real world of how people actually work (i.e. the market), or is just embedded in the research community.

Much past work has perhaps been embedded too exclusively in either the research community or the user communities, with not enough done to link between the market and the research communities.

Whether the research is obvious and part of the mainstream 1990s market (which has not been truly global), or is forward looking to future potential global markets.
Europe has tended not to be so forward looking as the USA, but this is where the big opportunities lie. The key point is that Europe is different from the USA, and this reflects the reality of the global market. An enlarged Europe encompasses even greater differentiation than does the EU and this reflects much more closely the real global market than the US market which is largely monolithic. Europe thus has an immense opportunity in the

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[55] http://www.eto.org.uk/gat

[56] The current list of the projects forming the cluster illustrates the rich variety of telework-related projects currently in progress. It is online, together with contact details, copies of presentations and reports, at http://www.eto.org.uk/ist-nmw.

future of richly diverse global markets, if we dare sometimes to be different and not look only at the so-called mainstream.

In addition, support for development of telework applications, with a focus on production process innovation, can be found in the Calls related to the Key Action "Innovative Products, Processes and Organisation" under Theme 3: "Competitive and Sustainable Growth", and in the joint call for proposals on intelligent manufacturing systems (IMS), particularly under the theme "Human/organisational/social issues".

Overall, the very rapid evolution of the technology is creating new opportunities for innovative thinking in new ways of teleworking. Europe has the chance to be at the leading edge in this field if we can keep on innovating.

Given that telework is a job-creating investment for the future we should expect that the R&D budget would be at the "top end" of these developments, also supported by other sources like the Structural Funds.

4.4   Trans European Telecoms Networks

Trans European Telecoms Networks (TEN-Telecom) is not part of the Fourth or Fifth Framework Programme RTD but is an investment stimulation action in the framework of the Trans European Network Chapter in the Maastricht Treaty. With its main aim at stimulating large scale deployment of Trans European Telecommunication Networks, it can assist in the deployment of projects after research has taken place in cases where additional Commission funding is seen to be an advantage. In fact the partners in some of the currently running TEN projects have been previously engaged in Research projects and special measures under the Fourth Framework Programme. The development of trans-European frameworks for telework is seen as a key to the further consolidation of the European market and to business competitiveness. At present, a number of these projects are concerned with telework.

The overall budget of TEN-Telecom is quite small at between 25 to 30 MECU/year. Overall objectives are to help launch trans-European telecoms applications and generic services by showing that the infrastructures can be used to help facilitate the transition to the Information Society by:
- strengthening the internal market
- assisting regions in working together in improving socio-economic cohesion
- demonstrating that through the use of ISTs, new activities and new employment opportunities can be supported

TEN-Telecom was established in 1994 with a number of preparatory actions following on from the Maastricht Treaty and the Bangemann Report. In 1995, Financial Guidelines for TENs were made available and the Euro-ISDN Guidelines were published, thus providing the first available platform for multi-media services to which all TEN-Telecom projects are linked. Since these developments, stress has been laid on the fact that applications require an integrative approach to different networks, e.g. ISDN, PSTN, mobile, satellite, more advanced broadband networks, etc., all of which need to be inter-operable. In mid-1997 new guidelines were adopted which defined a new working environment in which the main features include emphasis on full market deployment, public-private partnerships and areas of public interest which can provide the justification for additional Commission funding.

TEN-Telecom's areas of work are defined by these guidelines where the main emphasis is on applications with high public interest like telework, telecom services for SMEs, distance education, transport, environment, culture and health. Another basic line of projects is concerned with inter-operable generic services providing common tools for different types of applications, such as e-mail, but also multi-media tools and other support services like payment systems, etc. TEN-Telecom financial support should be seen as a catalyst which can assist in covering the risks rather than becoming the driving force of a project in its own right. Typically, up to

50% of costs can be obtained for commercial and feasibility studies, but the total contribution cannot exceed 10% for the whole project, including actual implementation.

In order to qualify for TEN-Telecom support, projects should:
- be able to fulfil users' requirements, i.e. users or their representatives should be involved
- be mature, i.e. all RTD activities are complete so the project is ready for commercial validation or at least the initial launch steps
- have potential economic viability, i.e. although these are areas of public interest it is expected that conditions are such that implementation can start on a long-term sustainable basis, e.g. by long-term financial commitments from public bodies, realistic assessment of income from users, etc.
- have solid commitment from public and private partners, e.g. in the case of telework there may be the expectation that SME representative organisations would be partners in addition to relevant public and private organisations.
- be trans-European, i.e. participants from more than one country.

One objective of TEN-Telecom is to establish a sound technical, operational and legal framework for a large number of businesses and other organisations to coherently integrate trans-European telework networks. The framework is expected to support European networks of call centres/service centres offering employment near the home in both urban and rural areas, European networks of business centres offering teleworking facilities to business travellers, and European virtual enterprises with a dispersed workforce of teleworkers in various countries.

The aim is to achieve open support frameworks for transborder telework, acceptable to the self-employed and small businesses, with reliable and secure communications, and with appropriate provisions for data protection, insurance, social security and health and safety at work. The framework(s) will be expected to ensure multi-media access to and from:
- individuals in their homes
- virtual corporate networks
- Internet/WWW and advanced high-speed services (ATM-based)
- cellular radio links to mobile terminals.

Initial feasibility assessments are prepared addressing technical feasibility, manageability, acceptability to all social partners concerned (notably to potential teleworking users of facilities), and the commitment of a substantial number of organisations to work together in making use of one or more trans-European telework frameworks.

4.5   Structural funds

The European Union intervention in support of structural adjustment through its Structural Funds amounts to almost 30,000 million ECU per year. There are four structural funds: the European Regional Development Fund (ERDF), the European Social Fund (ESF), and funds for the agricultural sector and for fisheries, as well as the Cohesion Fund.

Whereas the RTD funds are managed by the Commission, most of the Structural Funds are not. Only 9% is set aside for Community initiatives, the main part being managed by the member states, and indeed individual regions, themselves. In some of the Community initiatives, attention on new ways of working plays a role, for instance in Employment NOW (New employment Opportunities for Women). A specific mention of teleworking is given in the description of one of the four priority themes, i.e. the reconciliation of work and family life, where it is explicitly stated that measures for avoiding negative effects, like isolation and loss of social protection, should be included. The main initiatives are, however, to be found in the LEADER, ADAPT and EMPLOYMENT Initiatives.

In order to bridge the difference between regions in terms of the development of new ISTs, Article 10 of the ERDF and Article 6 of the ESF identify the translation of the Information Society concept into real life in the regions as a priority. This is achieved through the demonstration of innovation applications and services as one of the priority areas for pilot actions, of which telework is often an important component.

4.5.1   The LEADER Initiative

LEADER is the French anagram for Links between actions for the development of the rural economy. The Community's participation has been set at 1,755 million ECU of which 900 million ECU are for the regions of Objective 1 (lagging behind in development). LEADER I was established to bring the operation of the Structural Funds into closer collaboration with the Commission's RTD initiatives, such as ORA in 1990 and 1991. LEADER II applies for the duration of the planning period of the Structural Funds from 1994 to 1999.

LEADER covers geographical areas of limited size with a strong local identity. It is based on the active involvement of the local people, firms, associations and authorities. It serves as an incentive for development strategies adapted to the area's characteristics using an integrated, multi-sector approach.

Among the eight key points for rural territories[57], four of them may concern teleworking: activities and jobs; migrations and social and vocational integration; technological developments; competitiveness and access to markets.

Several teleworking projects have started under the "rural innovation programmes" (measure B), the "transnational cooperation" (measure C), as well as the European network for rural development (measure D). These are included in Annex 2.

Rural development is increasingly understood as sustainable integrated development to include social, cultural, economic and environmental dimensions in a context of geographic diversity. Issues about new ways of working with ICTs have been tackled by many project holders within the LEADER framework, with some success and many failures. During the European seminar entitled "new technologies and changes in rural employment" held in June 1998 in the Hebrides, seven case studies were investigated and four models of best practice were identified:
i)   ICTs in traditional activities, e.g. marketing local crafts, tourism, agricultural produce
ii) ICTs for job opportunities, e.g. call centres, teleworking
iii) ICTs in the delivery of services like health, education, public administration, etc.
iv) ICTs and networking, when used as a internal or external communication tool.

Further efforts are being put forward to bring ICTs closer to any activity or service bringing benefits to local people in rural areas and it is believed that innovative aspects of such projects will continue to be supported by the next rural development initiative LEADER+ (2000-2006).[58]

4.5.2   The ADAPT and EMPLOYMENT Initiatives

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[57] The eight key points identified by the LEADER network are: the mobilisation of the local population and social cohesion; the area's culture and identity; activities and jobs; the area's image; migrations and social and vocational integration; the environment, management of spaces and natural resources; technological developments; competitiveness and access to markets.

[58] More information on the rural development initiative and its operational projects is available in six languages from the Rural Europe Web site http://www.rural-europe.aeidl.be

Since the twin issues of growth and the promotion of the Information Society have become key priorities of the European Structural Funds, the development of new telework activities and services has received increasing support, especially from the European Social Fund. Social Fund projects often draw on experiences emerging from European RTD projects.

The ADAPT and EMPLOYMENT Community Initiatives have proved to be fertile ground for these new developments. Projects have been selected in a number of Member States within ADAPT, NOW and HORIZON. In ADAPT, more than 100 projects have been selected to pursue innovations in telework, tele-cooperation and teletrade. None of them are solely concerned with technology itself. Their focus is on the impact of technology on people and on companies, and the employment and efficiency opportunities it offers them. In fact these numbers understate the ADAPT telework involvement.

A much larger proportion of ADAPT's 4,000 projects are concerned with the adaptation of workplaces, companies and their services and production as a result of the introduction of new information and communication technologies. Not all of these are specifically concerned with distance working, but they are a direct response to precisely the same telework challenges to adapt work organisation and to re-skill workers. They demonstrate clearly the speed with which we are moving to a situation where telework is no longer seen as an exception, but as one normal form of work amongst others.

The Member States have now selected all the ADAPT projects. Most are still running, and will report their results during 2000. Meanwhile mainstreaming activities are being organised both at European and national levels. They have two purposes. The first is to incorporate the innovative results of the projects in national, and in some cases regional or local programmes, whether these programmes benefit from ESF funding or not. The second is to examine to what extent future National Employment Action Plans can benefit from the lessons learnt. Member States support this mainstreaming process in different ways. For example, the National Support Structure for ADAPT in Germany has set up an Internet Forum group for its telework projects. The ADAPT Support Structure in Flanders is planning a series of activities on call centres.

At a Community level the European Social Fund has published *Telework: tomorrow's form of work* (ISBN 92-828-4152-9), a synthesis of experience drawn from key ADAPT telework projects. This was accompanied by a catalogue of 100 telework projects, nearly all drawn from ADAPT, but including a small number from EMPLOYMENT.

The Commission plans to make the results of these telework projects available so that their experiences can contribute to the growing understanding of telework in the European Union. A number of trends have emerged which need confirmation from further research.

Contrary to belief, it is not the technology but the human factor which determines the success or failure of a telework project. Managers need to be convinced of the competitive advantages. Trade unions have to understand that the move to telework in itself implies no fundamental change in industrial relations between management and workforce. Employees and training providers need accept and understand new learning paradigms. The second determinant of success is improved co-operation between many bodies and structures at regional level, between SMEs and larger firms, and between companies and service providers.

ADAPT projects have learned that small business is not just waiting to move into telework. The abstract concept of "telework" is unknown to SME managers and owner-managers. However, the picture changes, often profoundly, when they discuss new business ideas, or when they look for a competitive edge from increased use of ICTs, remote access to data and electronic transfer of information. Support is needed at all levels. Small companies are often not well equipped to manage in-depth changes in the way they organise their work, following the introduction of NICTs. They cannot independently offer the broad range of training and learning needed to underpin profound changes in company culture and management style. Neither can they guarantee permanent guidance and coaching services. Telework in small companies needs an holistic

approach, and access to some structure able to support these processes by co-ordinating service delivery. SMEs need a single contact for this broad support: a one-stop shop, or a virtual one-stop shop.

A number of ADAPT promoters have seen the offer of training in NICTs as a good way to foster the idea of introducing telework into small companies, and to stimulate the creation of new business. Traditional training, even when delivered from distance via ICTs, is not effective. Companies cannot afford to release their staff for long training courses. They need direct solutions to their immediate business problems.

Training and learning need to be adapted to real SME needs, tailor-made to each workplace. A learning by doing approach is more important than having permanent access to learning. NICTs require the trainer to re-skill from being a deliverer of content to become a coach or mentor to the learner. To respond to this new challenge, a number of ADAPT projects have developed tele-coaching concepts and methodologies, using all kinds of information and communication technologies, including videoconferencing. In short, the training business has to replace its supply-driven policy with an approach that responds to a demand-led market.

Most telework companies are in fact learning organisations, placing great emphasis on better communications, translating experiences into new production processes, and integrating work and training. They tend to have flat hierarchies, are decentralised, and depend on group and project work. They are perfectly designed for e-commerce, incorporating learning processes, planning, training and management issues into the design of their companies.

Telework offers potential for co-operation between companies. ADAPT projects are capitalising on these new opportunities to join existing supply chains. Many are creating tele-networks of experts in various fields offering their client networks important resources of knowledge, support and expertise on-line. Others are creating virtual companies enabling SMEs to compete with larger firms, either by exploiting small market niches or by pooling their resources. Outsourcing of marketing or servicing is leading to the creation and development of call centres throughout Europe. ADAPT telework projects are analysing their changing management qualifications, and the new job profiles and new organisation and training approaches they require.

Telework can create new opportunities for business in a region. It also offers an excellent platform to support co-operation among its key people and organisations. Traditional representative bodies can be transformed into stakeholders, mutually working to develop the region. To succeed, they need to analyse the market, and pool resources in R & D, training and consultancy so as to support new businesses, and create a favourable environment for entrepreneurship.

The creation of telecottages or telecentres offers only a small number of direct new jobs, but can raise awareness amongst company managers of new opportunities. It mobilises local authorities, social partners, regional universities and the business community, can create new ICT-supported networks, telework and tele-training opportunities, and can revitalise an entire region. For that reason it is important that telework promoters look beyond their immediate interest in creating a telecentre, and focus on these co-operation processes. By doing so they can help guarantee the sustainability of the companies and centres they have helped create.

ADAPT and EMPLOYMENT-NOW projects show that telework can be tailor-made to be gender-fair, creating opportunities for women and men to gain access to all types jobs. IT programming, staffing help-desks, data compilation, providing training support, selling goods and services, are just a small number of examples. Telework is also providing women with access to the labour market through self-employment and the creation of new business. The flexibility of this form of work does, however, also have to be accompanied

by measures to tackle social isolation, to provide child-care, to assure social protection and to protect wage levels.

Telework is proving an effective means of providing jobs for people with disabilities, and for others who are immobile or disadvantaged. EMPLOYMENT-HORIZON and EMPLOYMENT-INTEGRA projects show two strategies at work: well designed and targeted awareness-raising campaigns directed at increasing job opportunities in existing firms; and support for individuals creating their own businesses. However, more is needed to prevent teleworkers with disabilities becoming socially isolated. Regular contact with other teleworkers, with clients, and with technical and other support structures can help them to use telework as a means of integrating further into regular work.

Telework provides good opportunities for self-employment. But ADAPT and EMPLOYMENT projects have learned that implementing a business idea is not always straightforward. Neither the technology itself nor telework as a working method seem to create major problems. But most new teleworkers, having worked as employees or been unemployed for some time lack the managerial skills they need to start their own companies. They often underestimate the time needed before a business generates the funds to be fully viable, and they tend to underestimate the effort required to generate clients or access funding for new investments. A strong support network is a prerequisite for self-employed teleworkers.

Telework was seen until recently as a form of work which could be fitted to people's individual needs, allowing them to overcome the constraints of place and time. This situation is changing. The frontiers between changes in work organisation and the implementation of telework are blurring. Employees are not confronted with a situation where they have to choose between telework and "normal" work. In fact an increasing number want both a working place in an office with other colleagues, and also the opportunity to do some work from home or at clients offices. In this respect, telework is offering a win-win situation to both workers and companies, providing each with flexibility. Clearly, a number of barriers continue to exist, mainly in SMEs, and may take time to be removed. However, the situation is improving, probably linked to the success of the Internet.

At European level, the new Community Initiative EQUAL will draw upon the experiences of ADAPT and EMPLOYMENT. It will also take into account the priorities for the new programming period of the European Social Fund, above all the support for innovation and adaptation in work organisation, the development of entrepreneurship, and equal opportunities to access the labour market. Telework will be an increasingly important aspect of projects from all Member States, as partnerships of labour market bodies, educational institutions, social partners, firms and non-government organisations explore ways of using the potential of ever more sophisticated information and communication technologies to reduce discrimination and improve access to the labour market.

4.5.3   Article 10 (ERDF)

In terms of inter-regional cohesion in Europe, recent statistics indicate that the least-favoured regions are faced by a "technology gap" twice as great as the differences measured by income per head. In line with the priorities of Article 10 approved for the 1995-1999 period, innovative measures aimed at developing new ways of introducing innovation in the regional development agenda of the less favoured regions of the European Union have been introduced. These include "increasing awareness in SMEs from less favoured regions about research and technological development activities" and, more generally, about the regional economic implications of technological change, as suggested by the Regional Commission of the European Parliament.

One of the priority areas for pilot actions under Article 10 of the ERDF and Article 6 of the ESF for the 1995-1999 period is the translation of the Information Society concept into real life in the regions through demonstration of innovative applications and services, i.e. Regional Information Society Initiatives (RISI).

RISI has two elements:
a) RISI 1 - the development of a regional partnership in the elaboration of a regional Information Society strategy and action plan and
b) RISI 2 - preparation and launch of pluri-regional pilot applications for demonstrating best practice and developing know-how in the regional deployment of the Information Society.

The Information Society is revolutionising the ways in which we work and live together. For the regions of Europe, their future economic and social well being will depend to a large extent on how they are able to participate in the Information Society in the making. This pilot action therefore aims to help regions benefit from the opportunities now opening up to them and to minimise the risks of being left behind in this revolution.

The overall policy in the Information Society Strand of Article 10 is to pursue an active learning strategy both within a region and between regions. This will take place through the stimulation, experimentation, evaluation and diffusion of best practice in the creation of the necessary socio-economic conditions for the development and implementation of teleworking, SME networking and other Information Society services and applications which will in turn contribute to regional economic development, in particular in the less favoured regions (LFRs) of the European Union.

Projects under RISI 1 (Information Society Strategy and Action Plan) draw on the lessons and follow the pre-pilot experience, launched in 1995, of IRISI (Inter-Regional Information Society Initiative) in six test regions in the Union (Piedmonte, Valencia, Nord Pas de Calais, North West England, Central Macedonia and Saxony) [59]. The overall aim is to enable regional partnerships to make better use of existing resources for developing the Information Society.

These pilot projects follow an interdisciplinary approach and are being followed and managed jointly by DG XVI (Regional Policy and Cohesion) in cooperation with DG V (Employment, Industrial Relations and Social Affairs) and DG XIII (Telecommunications, Information Market and Valorisation of Research). [60]

RISI 2 (Pluri-regional Pilot Applications) projects focus their scope on the Less Favoured Regions (LFRs). Rather than identifying specific basic services and generic applications, these projects try to demonstrate innovative uses of validated information and communication technologies in working and trading in LFRs. The focus is on the adaptation of existing validated technologies, rather than on new ones.

4.6   Awareness raising: ISPO

ISPO is part of DGXIII and has the objective of promoting cooperation and development in the Information Society in Europe. ISPO's role is as a service unit established by DGIII and DGXIII to act as a bridge builder between Commission Services and external counterparts active in Information Society issues, including technological, social, economic, etc.

ISPO is part of the Information Society Activity Centre (ISAC) whose role is to raise awareness of the opportunities and impacts of Information Society development by arranging special events, providing a leadership role in running conferences, participating in other relevant conferences, workshops, seminars, etc.,

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[59] more detailed information about the IRISI pre-pilot actions may be obtained at the Web site http://spavalda.polito.it/

[60] more detailed information about the RISI 1 pilot actions may be obtained at the Web Site http://www.risi.lu.

and in participating in selected projects. The intention is to be present whenever Information Society related issues are discussed, whether these are positive or negative.

ISPO operates a series of information services, based upon alternative information distribution technologies and channels, for example

- a web-site (http://www.ispo.cec.be) which acts as a one-stop-shop in the area of the Information Society, a European "hot site" with more then a million hits per month
- a monthly newsletter, free of charge and available in both paper and electronic forms
- a help desk and free-phone service

The brokerage of ideas, applications and services is an important function of ISPO, and it is especially interested in best practice lessons and success stories which have a portable value. ISPO also provides guidance on Commission funding instruments, especially for newcomers who have a good idea but need relevant contacts in the Commission. The collection of information from a variety of sources is another area of activity, to which value is added in order to provide open information inventories. This also involves linking to external information services, thus maintaining a network of networks to provide easy access to relevant information through a concept of decentralisation in which each information source is maintained where it has been established and where the interest and expertise is to keep it up-to-date, rather than by ISPO itself.

ISPO also establishes and manages small scale programmes and projects with its own calls under the umbrella of Information Society promotion. The first call in 1996 received over 100 proposals, from which 16 were funded

ISPO also supports DG XIII in advertising European Telework Week and other events of the European Telework Agenda.

5 Telework outlook – 1999 and beyond

5.1 Coming to a desk near you…

This section describes major trends in technology as they affect new ways of working and doing business, and links this with progress in Europe's Information Society Technologies (IST) Programme.

The pace at which we are now creating and adopting new technologies is unprecedented and this Status Report cannot do more than provide a snapshot of the changes that are most relevant to new ways of working and doing business, particularly telework. When we make decisions about our current and immediate future uses of technology we need to think forward to what will happen next, so that today's experience represents positive progress rather than leading down a blind alley. So we start with some comments about the main developments that can be expected during the next five to ten years, as reflected in work underway and being started in Europe's Fourth and Fifth Framework Programmes (see Section 4). We then focus in on how these technologies will be used and their relevance to new ways of working and doing business.

5.1.1 Critical trends

What arrives on our desks, in our homes and cars and in our pockets is ultimately determined by the underlying trends in the main technologies - computer hardware, telecommunications capacity or bandwidth, physical dimensions (size and weight of components relative to performance), software intelligence and usability, and cost. In all these aspects, the main trends of continuing improvement can be very confidently be expected to continue for at least the next ten years; in the telecommunications field, liberalisation and re-regulation should lead to continued acceleration rather than a steady trend.

Systems price-performance
Even though computers have consistently delivered between 20%-30% annual improvements in price-performance for three decades, many organisations planning their use of computers fail to take this fully into account. It can take from one to two years before a significant new organisational use of technology goes through the stages of proposal, decision, implementation, learning curve and effective use. A 30% price-performance curve means that the current acquisition cost will be halved or the performance will be doubled by the time the new approach is fully embedded in the organisation. By the end of the (say) five years over which we may have justified the project, current cost will fall to about one sixth of today's costs (or the performance will have improved six times). Instead of thinking "What can we afford to do today?" or "What is practical with today's technology?" our strategic planning needs to be on the basis of "What will happen when the technology offered ten times the performance or one tenth the cost?". We still have to buy and use today's technology at today's prices of course, but our approach to it's acquisition and use will be profoundly different if we consider these factors. Since it takes as long or longer to change an organisation as it does to learn and use a significant new technology application, we need to think forward to how markets and society will have responded to this continuing enhancement of technology capacity and price.

Communications bandwidth and cost
During most of this century public telecommunications service in Europe has been the exclusive preserve of government owned or directed monopolies. These "operators" invested in providing and enhancing monolithic networks to deliver "plain old telephone services" to every household and priced their services based on recovering the cost of this infrastructure and returning whatever level of profit they or their government regarded as appropriate. It was difficult (in many cases illegal) for other organisations to compete with these monopolies, so that service and cost improvements were decided by the suppliers rather than forced by

competition. Today that has already changed in much of Europe and is changing across Europe as a whole because of European policy on liberalisation and re-regulation of telecommunications markets. Higher levels of investment in new technologies and higher capacity is matched by the energy and innovation of new entrants to the market. However, the pace of change varies considerably from country to country, dependent on local interpretation of liberalisation policy, which significantly affects the attractiveness of local markets for investment by existing and new suppliers. Where computer and local networking price-performance changes are roughly comparable across Europe, we cannot yet say the same for wide area communications bandwidth and cost (see panel).
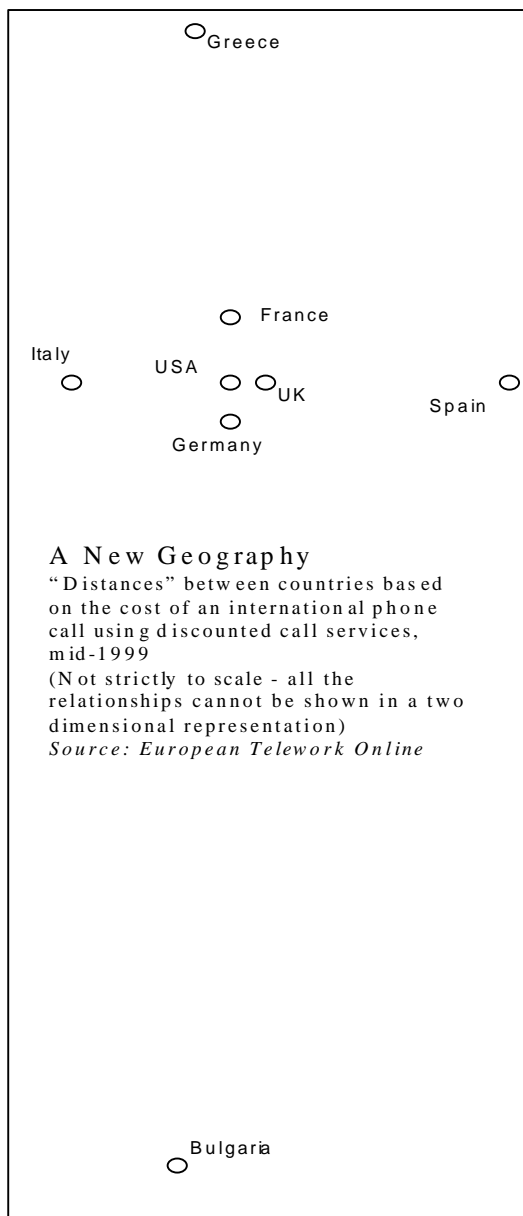
A New Geography
"Distances" between countries based on the cost of an international phone call using discounted call services, mid-1999
(Not strictly to scale - all the relationships cannot be shown in a two dimensional representation)
Source: European Telework Online

Greece, France, Italy, USA, UK, Germany, Spain, Bulgaria

Miniaturisation

Alongside increasing capability and reducing costs, another main thrust of development is to continue the reduction in physical size and weight of all kinds of ICT devices. Today's palm-top computer-communicators pack more performance than desk top machines of five years ago and business systems of ten years ago. Tomorrow's technology will pack even more capability into devices the size of a wristwatch or even smaller. "Wearable" systems already being investigated in the laboratory will mean we can "put on" our basic computer and communications support as we get dressed in the morning, rather than needing to remember to take the mobile phone and lap top with us. UMTS communications[61], the successor to the European GSM standard for today's mobile phones, will mean our minaturised portable systems can be in routine contact with our desk-top and office systems so that we as users can have a single consistent approach regardless of where we may be. Eventually, miniaturisation means that systems capability can be incorporated into almost any item we use, including books and magazines, clothing, domestic appliances, as well as every aspect of travel and transport.

Intelligence and usability

Following initial rather overblown hype in the early 1980s the idea of "artificial intelligence" or "expert systems" became somewhat downplayed and suppliers have been hesitant to apply the term "intelligent" to their systems and applications. Certainly, systems that are "generally intelligent" in the same sense as human intelligence remain a rather distant possibility. However, in the sense of "intelligent responses to situations and needs", it is equally true that our systems are becoming more intelligent with each year that passes. An example of intelligent behaviour in today's systems is the way that your current web browser may suggest, when you visit a new site, "To view this site as intended, you may wish to download the XYZ language character set; do you wish to download it now?". If you say "Yes", the systems finds the site with the appropriate character set, downloads and installs it, all without you as the user

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[61] UMTS stands for Universal Mobile Telecommunications System. The technology, which is in field trial with leading suppliers of mobile communications, is expected to come into service starting in 2001-2002. UMTS data rates up to 2 gigabits per second can provide on-the-road communications at very much higher speeds than the fastest modems we currently use at home on normal phone lines. For more information see the UMTS Forum, http://www.umts-forum.org.

needing to understand any of the processes involved. Five or six year's ago this kind of behaviour in systems would have been quite remarkable; today we take it for granted that our systems and the network interact in such ways. In today's research and development programmes, a major focus is on "intelligent agents" - software applications that can gain an understanding of the user's needs and be sent of to explore the Internet looking for and reporting back on relevant finds. Other forthcoming aspects of "intelligence" include systems that sense the user's level of experience and understanding of an application and adjust the interface and behaviour of the application accordingly. Other research is investigating and testing systems that "know" where the user is and where they want to go and what modes of transport are available, suggest the best routes and - if appropriate - arrange the bookings and payments. All these efforts are designed to make applications more attractive and easy to use and release the user's time and energy to focus on their own needs and priorities.

Cost impact of liberalisation
Costs still differ considerably between countries and this can significantly affect attitudes to innovation on the part of both decision makers and employees. Internal facilities and costs in most EU countries are still mainly affected by the history of investment during the pre-liberalisation period; external costs are more immediately impacted by liberalisation. The panel "A New Geography" (*Communications bandwidth and cost*, above) illustrates how local (country) conditions affect the cost to citizens and businesses of a typical competitive service - the provision of discounted international phone call services. When a business considers the opportunities presented by globalisation, including telework and e-business, the "perceived cost" of connecting with customers or employees includes the cost of simple phone calls. The table shows examples of how widely these costs vary within Europe and between Europe and other regions[62]. For each of the European Union countries shown, the "nearest" country in terms of international call discounting is the USA, with the UK second, Germany second, France third.

Costs of discounted international phone calls for calling to and from selected countries							
Calling from:	**To:**						
	USA	UK	Germany	France	Italy	Spain	Greece	Bulgaria
USA		16	18	20	25	30	39	40
UK	14		18	20	25	30	39	40
Germany	19	19		28	33	28	48	122
France	21	19	21		30	35	39	62
Italy	24	23	24	27		49	58	64
Spain	27	25	28	27	34		44	50
Greece	49	50	56	59	64	69		79
Bulgaria	100	112	126	125	135	136	139	
Source: European Telework Online							

Among the major EU countries, the one with the earliest and most vigorous liberalisation programme (UK) has gained a competitive advantage, with the best "offer" of discounted international calls to all countries for its own citizens and businesses and as a low-cost destination to call from most countries. Cause for concern and continued focus is the fact that the USA is, in phone call terms, "nearer" to Germany than France or Spain. Europe has a unified policy towards liberalisation, and increasing globalisation of competition as well as technologies such as Internet telephony (see below) will lead to converging prices for some services, local conditions in each country will continue to affect what is delivered to users at what price in future years. The examples of Greece and Bulgaria show what effort is needed to progress towards parity of costs for EU countries with more restrictive telecom environments and for some aspirant Member countries in the rest of

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[62] The "New Geography" map combines a number of factors; for simplicity of presentation the table shows only call costs.

Europe. We may be able to email telework colleagues in Bulgaria as easily and cheaply as those in the UK or in France, but we will pause for thought when we consider phoning them.

5.1.2   A medium-term scenario

What is the likely impact for new ways of working and doing business of these technology developments? In the medium term (5-10 years) we should expect to see:

Low-cost data communications devices marketed as consumer products
The rapid consumer take-up of mobile phones will be followed by a proliferation of novel devices capitalising on the increased bandwidth provided by UMTS deployment from 2001 onwards. As with basic telephony, this may start with high-price devices targeted at the executive and business user but investment trends suggest a shorter lead time before consumer products go into mass production and marketing. Many people already carry a radio-compact disk audio player and a mobile phone; sometimes they also carry a digital camera; combining UMTS communications with technologies such as DVD[63] and embedded computing capabilities suggests many attractive entertainment, leisure and travel applications. Such developments feed back into the business market by bringing down the price of both devices and services.

Increasing bandwidth to the home
Many alternative approaches and variations in local regulatory environments mean very wide variations in the extent to which homes in different parts of Europe and even different parts of the same country will enjoy increasing bandwidth and reducing bandwidth costs during 2000-2010. In one country (UK) the established phone services operator (BT) has announced the intention to rapidly deploy ADSL[64] nationwide, a move which could force the pace of bandwidth marketing to consumers by competitors using other technologies such as cable. As consumers start to use higher bandwidth communications at home and on the move, it becomes more and more obvious that a high proportion of work can be undertaken anywhere, anytime and the established pattern of "going to work" at set places at set times will be more and more open to question. This will also facilitate communications between employers and their home-based employees in other countries, encouraging trans-border teleworking.

Pervasive computing and connectivity
Within the next ten years we can assume that most European homes will have Internet connection, from appropriate combinations of PC-like and TV-like devices. In more affluent areas with high-performance low-cost infrastructure, other home appliances (eg refrigerators and other food stores) will be connected and the home as a whole will be "wired". Similar connectivity will be commonplace in public places. Cars, buses, trains and aircraft will be connected for control and information purposes and will provide connectivity for their passengers. Hotels, bars, libraries and other "public" buildings will also provide plug-in capabilities for visitors as well as public access devices.

Personal systems and networks
The "personal" computer is only truly "personal" if an individual user has exclusive use and is the only influence on (for example) what software and applications are used). In business the enterprise rather than the individual chooses the main aspects; in the home a PC is often shared by family members. But forthcoming

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[63] Digital Video Disk *or* Digital Versatile Disk

[64] ADSL = Asymmetric Digital Subscriber Line. DSL technologies enable data communications up to 2 Megabits per second and higher across the copper twisted pair lines that currently connect most subscribers to local
exchanges. ADSL means different speeds in each direction - higher speed from exchange to user (downstream), slower speed from user to exchange. The achievable downstream speed varies according to distance from the exchange - typically 2 Mbps at three miles from the exchange. Upstream speed could be expected to be 64 kbps - the same as an ISDN line.

"personal systems" will be more truly personal - they will be designed to be used by a individual and, in use, will "learn" about the activities and capabilities of their user (or wearer!) so as to make themselves more useful and more usable. Employees, whether working at home or at an employer's office or on the road will have continuing access to their "personal systems and networks" in the same way that today we all have our own personal diary, wallet, money, credit cards etc at all times. The individual's investment in and skills with personal systems and networks will affect work performance and employability. This will further underpin the trend towards a more individual approach to work, and the idea that individuals and employees will mutually agree on "working where it makes sense to work" rather than conforming to a "normal pattern". Personal systems and networks will also contribute to reducing the significance of geographical location. From a technology standpoint it will be easier to recruit, interview, hire and work with someone who may be 1,000 miles away, although legal, tax, regulatory and cultural considerations will continue to play a key role in determining how this works in practice.

Online "skills and time" markets
European projects in the Fourth Framework Programme investigated and pioneered approaches to matching personal skills to business requirements online (see Annex 2). There are serious obstacles to the success of such services across national borders, even within the European single market[65], but during 1998-1999 a number of commercially based services have started to emerge, some of which show signs of potential success and sustainability. The most active of these are currently in the USA, where levels of Internet use among employers and teleworkers are higher than in most of Europe. New levels of "intelligence" in systems and networks, coupled with increasing familiarity with online working, and wide variations in wage costs and overheads across Europe (including Central and Eastern Europe) make it likely that effective services of this kind will emerge within the next five years.

Language technologies and enhanced online cooperation
Language technologies already allow any web user browsing (say) a German website to see the text of that site in a reasonably intelligible English (say) translation. The speed, comprehensibility and accuracy on such "on the fly" translation will continue to enhance and is a good example of using the network to share high performance computing among large numbers of users. New technologies emerging in the Fifth Framework Programme will support multiple cooperating websites that target common topics and audiences in different languages, cultures and countries. Combining these opens up new opportunities for small enterprises and individual teleworkers to establish a combined real and virtual "presence" in culturally or geographically distant markets, as well as enhancing online cooperation and knowledge management within larger (global) enterprises and their supply chains.

New approaches to pricing of communications
Internet telephony (using the Internet instead of the phone network for long distance and international calls) has placed a new emphasis on thinking about novel ways to charge for telecommunications. One distinct possibility is that users will have the option to pay varying rates for the same kind of service according to the "quality of service" they desire, with technology able to map different kinds of tasks to different network performance needs. For example, it is possible to engineer services such that we receive email in background at a very low cost, pay a little more for simple voice connection, more yet for slow speed video (children showing photographs to Grandma) and a higher price per minute for high performance virtual presence (business meetings online). All this would be handled by the network without user intervention. Fourth Framework Programme projects and related teams have examined both the technical and delivery implications of such approaches.

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[65] For a discussion of these obstacles see http://www.eto.org.uk/faq/faqtwreg.htm

5.1.3   Technology in context

The fact that something can be done does not mean it will be done. Technology enables new ways of working and doing business; social, cultural, economic, regulatory and fiscal factors - plus of course our personal and organisational preferences and expectations - determine what actually happens. Europe presents great diversity in our existing use of technologies in business and work; much of this diversity is a healthy sign of freedom of choice and our richly varied cultural and social heritage. The important thing for all European enterprises and citizens is that we continue to have and exercise freedom of choice. This means continuing efforts to make sure that new technologies and services are available and affordable - on the islands of Greece and in all our small rural villages as well as in the economic centres of Frankfurt and London and in the information-rich economies of Scandinavia.

Evolving technology and competition mean that technical or cost constraints on how we work and do business diminish week by week, month by month, year by year. The choices of how to work and do business widen, week by week, month by month, year by year. Our very wide variations in response across Europe and elsewhere (as indicated in Section 3), together with the many different ways in which people and organisations succeed (and sometimes fail) in their use of teleworking confirm that there is no one "right way to go forward" and no single "right" answer to the many issues and questions raised by people and their representatives. The evidence does however suggest that "bold innovation" coupled with appropriate safeguards is preferable to cautious resistance to change.

5.2   Fifth Framework Programme: IST programme status in mid-1999

The overall aim of the IST Programme is to centre the Information Society on users and citizens and their needs. It reflects and supports EU policies, notably fostering the convergence of information processing, communications and media, and the need for interoperability and coherence at a global level, but also coherence in application of emerging technologies to support business competitiveness and improved quality of working life. The Specific Programme therefore foresees "close articulation between research and policies needed for a coherent and inclusive Information Society". A sum of 3.6 billion Euros is allocated to Information Society Technology (IST) development over the next 4 years, combining with and building on the previous work of ESPRIT, ACTS and the Telematics Programmes. One of the four Key Actions addresses "New methods of work and electronic commerce, with an indicative budget allocation of about 550 million Euros.

Following the first Call for proposals in March 1999, for most action lines in this Key Action, a first set of projects specifically aimed at new methods of working in and between organisations has been identified. New work will start in January 2000.   The strongest response from the Research Community has so far been on the action lines concerning technology developments related to dynamic networked organisations, and knowledge management and teamwork, rather than, at this stage, on workplace design. Substantial further development of shared software systems for distributed business processes, knowledge management and groupwork can be expected.

The second call in September 1999 explicitly invites proposals for research to improve our socio-economic understanding by addressing "New Perspectives for Work and Business" and for experimental implementation of emerging technologies, notably to promote "first use" and "best practice" in use.

An Advisory Group has been set up to guide the Commission in how to get best value for money from the IST Programme. It is responsible for setting general orientations for the evolution of the 1999 work programme. The Workprogramme for 2000 will be finalised in consultation with the Group by November 1999, but the main orientations are already clear: The key feature will be to take advantage of developments in networked intelligence and intuitive usability to begin to put technology in the background so that it

becomes invisible, leaving only the user-friendly services visible and just as easy as to use as switching on the TV. A recent worldwide survey of 14,000 people shows a clear difference between the way Europeans and Americans regard the technology: the latter embrace technology much more readily and use it because it is new, whereas in Europe people tend to prefer to keep it in the background and use it only when it gives clear and visible benefits. This difference in attitude will be particularly important in design of future workplaces, where-ever they are, and for the efficiency of use of skills by most people in the European workforce.

A consultation meeting in September 1999 on "sustainable workplaces" in the future global economy has also helped to re-focus attention on the emerging workplace design issues, and on the opportunities to use the built environment more effectively, and to reduce the overall resource-use impact of emerging workplace technologies.

The changing technological landscape provides immense opportunities for changing, and improving, methods of work both in this perspective of overall sustainability and for individuals. Fixed-line services are used by about 700 million subscribers worldwide. However, mobile telephony is rapidly overtaking them. There are already more mobile telephony subscribers than fixed-line subscribers in some EU countries, and the World total will probably exceed 1 billion by 2005. A key workplace tool has already become portable, and will soon be "wearable". With the simultaneous introduction of the 3rd Generation "UMTS" systems in Europe by January 2002, this tool will also be able to support web access and video communications. The widespread use of "voice interfaces" instead of keyboards for work-purposes will also enable, and be accelerated by this shift to portable and wearable equipment.

However, the dominance of "voice" communications on the fixed and mobile telephony networks is also now challenged by the rapid growth in data communications, largely associated with Internet use. The total volume of data is now likely to exceed that of "voice" traffic within the next year. By 2005, voice communications may become a niche service, representing less than 10% of total traffic. Data communications will dominate, with the Internet Protocols as the underlying basis for networking activities. This shift is largely driven by changes in work and in how people work. Yet, in the workplace, innovation is needed in how information is presented and in how people interact. In this time of innovation and turbulence, Europe must remain at the leading edge of both technology development and its intelligent use.

The growth of data services arises out of the convergence between information technology and telecommunications, two sectors which were quite different a few years ago. Previously separate networks for telephony and cable-based video distribution are being transformed and merging. In regions of Europe with a dense cable TV network, it is now possible to have high-speed Internet connections (a couple of Mbits per second) which are ideal for work in telecentres in residential communities, in decentralised business premises and in the home.

These integrated networks give seamless access to a wide variety of services: removing any difference between data-,video-, audio-, mobile- or traditional telephony-services. Multi-purpose terminals for mobile and multimedia communications, and greater intelligence in networks, will allow all services to be used at a reasonable cost, but probably with different access networks depending on population densities and legacy networks. However, very high-speed backbone infrastructures are being progressively integrated on a pan-European basis.

Communication tariffs are falling fast: because of competitive pressures in a liberalised European market, and cost reductions from technological development. In particular, tariffs for long-distance communications are falling most quickly, and this "death of distance" will have dramatic effects on the geographic distribution of business activities, work and the provision of information services. Many new forms of work really will become independent of place, giving a further impetus to the globalisation of business and trade. Europe's strength must therefore, more than ever, be built on the skills of the workforce and the efficiency with which they are used. This , in turn, will depend on significant improvement in the user-friendliness of technology tools in European working environments. This will require::

- **user-centred design**: this is a critical requirement in developing new technology.

- **universal access**: anywhere and anytime. We cannot afford to have newly disadvantaged regions or groups of people in Europe. A simple telephone line, and telephone, is no longer sufficient. Access to all Information Society services will become increasingly important for many types of work; for most business activities and for effective social integration.

- **scalable communications** under the individuals control will also be necessary. The speed of current technology development is stressful for many users, and everybody will not need or want full connectivity at all times. People need to be able to disconnect or adjust the "volume" of information flows to suit their environment and job. Many new services may need to be accessible at different speeds and with different qualities of service in different regions, depending on the capabilities of the infrastructure.

- **multi-modal dialogue**: with transparent gateways between services, for example to enable virtual presence, collaborative working independent of distance or distance education, which means that video, audio and data should be merged

- **multi-linguality**: the ability to be able to produce, handle, retrieve and communicate information in one or more languages of your choice is particularly important for Europe, so that technologies for automatic translation and for voice recognition are very important

- **flexible formats** for information presentation: at the right level of detail.

- **next generation interfaces**: specialised devices for specific groups of people or specific situations, e.g. the handicapped, or people on the move, involved in nomadic working, etc. These are situations which are more demanding than normal.

- **trust generation**: if we rely more and more on the information infrastructure and the intelligence of the network, it is important to have technologies which will generate trust and privacy where this needed, so that we can be sure we are communicating with the people we think we are. The more the technology is in the background, the greater is the need for trust on issues like this.

Overall, the very rapid evolution of the technology is creating new opportunities for innovative thinking in new ways of teleworking. Europe has the chance to be at the leading edge in this field if we can keep on innovating.

Given that telework is a job-creating investment for the future we should expect that the R&D budget would be at the "top end" of these developments, also supported by other sources like the Structural Funds.

5.3   Awareness activities

In order to be kept informed and play a part in the developments, it is important for all to participate in appropriate networks of people with similar needs. Except where stated, information on the initiatives mentioned below is available at, the European Telework Development website[66].

5.3.1   The European Telework Agenda

The European Telework Agenda (see section 3.17.1 above) will focus its resources for the next year onto the International Telework Workshop in Tokyo, the European Assembly in Aarhus, Denmark, the 1999 European Telework Week and the Telework awards, each of which brings together as many of the interested parties as

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[66] European Telework On-line: http://www.eto.org.uk, see e.g. /events and /agenda.

possible. This sub-section gives a short introduction to each of these initiatives. However, many more will take place and may well be worth taking notice of. [1]

5.3.2   *The Fourth International Telework Workshop in Tokyo, 31 August to 3 September 1999*

This is the first event in the International Workshops on Telework series to take place outside Europe, and emphasises the global nature of the issues and discussion. The main theme is "Telework Strategies for the New Workforce", reflecting the great changes in the workforce in terms of demographics, gender balance, growth of employment in services, part-time working, etc., as well as in terms of the way people are working. The focus in Tokyo will be on telework, virtual collaboration and virtual enterprises.

The Telework Workshop series dates back to 1996:
- 1996: the first Workshop in London with the theme "New International Perspectives on Telework"
- 1997: the next Workshop in Amsterdam, was called "Building Actions on Ideas", looked at innovation issues and how to implement virtual working, as well as at social and organisation dynamics.
- 1998: the third Workshop in Turku, Finland, called "Teleworking Environments" had a focus on the different environments necessary to promote effective teleworking – from, for example. the team working environment, to the national policy environment, etc.

Japan 99 is being organised locally by the International FlexiWork Forum. The Workshops are promoted and take place under the auspices of the International Telework Foundation. The idea is to bring individuals together internationally who are doing authoritative research, particularly in the scientific and academic communities, including research into the conceptual and theoretical areas of virtual working. The Workshops provide an arena for 3 to 4 days where small groups of researchers, scientists and policy makers can debate, interact and have their ideas subject to critical peer appraisal.

As well as plenary sessions, four workshops will take place:
a)   human resource management: the management issues relating to the new workforce and teleworking, e.g. decision making, training, challenges posed by e.g. fast companies, freelancers, etc., marginalisation and isolation issues, etc.
b)   innovative work processes: the latest developments in implementing telework but also frameworks which might guide and help us to make sense of this
c)   technology and space: developing platforms needed to create effective collaborative working environments, not just the technological issues but also the team dynamics involved, building effective working relationships
d)   regional development: telework and telecentres and policy development contexts necessary to promote environments in which telework can flourish

The final day of the Workshop will be an open conference in order to provide an opportunity to feedback some of the findings from the four workshops. This day is important for disseminating the results of the research out to wider audiences and it will also see participation by the SoHo community in Tokyo. Key note speakers will be from Japan, the USA and Europe.

In the year 2000, the Fifth Telework Workshop will be held in Stockholm and has a provisional title of "Teleworking in the 21st Century". Information on past workshops, Tokyo 1999 and Stockholm 2000 can be found on the web.[67]

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[67] The International Telework Foundation: http://www.teleworkfoundation.org
    The International FlexiWork Forum: http://www.iff.org/telework99

5.3.3   Sixth European Assembly on Telework and New Ways of Working, Aarhus, Denmark, 22 to 24 September 1999

The goal of "Making Telework Work For All" reflects the Danish and wider European concern to show that telework and other new ways of organising and carrying out work can benefit individuals, families, local communities and public services, as well as enterprises and the economy. Thus the 1999 Assembly is built round the needs of four main audiences each reflecting a major conference theme:

1. *Audience:* politicians and legislators, and other policy makers
    Theme: the social, employment and labour market policy aspects of new work
2. *Audience*: executives and managers wishing to enhance organisational flexibility and effectiveness through telework and new ways of working
    Theme: the business case for new ways of working including its links with e-commerce
3. *Audience*: representatives from local and regional economic development agencies, plus those concerned with equal opportunities and special groups
    Theme: the socio-economic aspects of new work, ensuring that individuals, families and communities can all benefit from flexible working in the 21st Century.
4. *Audience*: technology and infrastructure suppliers and technology specialists and consultants
    Theme: innovation in technologies, infrastructures and services which support telework and new ways of working.

A number of top key-note speakers and presenters from both private and public sectors and the European Commission are already booked, including:

Kevin Kelly: the highly respected Executive Editor and founder of *Wired Magazine.* Based in California, Kevin has successfully analysed the business strategies mandated by the new network economy in his new book *New Rules for the New Economy: 10 Radical Strategies for a Turbulent World*. Kevin will talk about how business and work are changing in the network economy, and debate this with Diane Coyle and other speakers.

Diane Coyle: the distinguished Economics Editor of the *Independent* newspaper in London. she is the author of the highly acclaimed book *The Weightless World – Strategies for Managing the Digital Economy*, which was a recent *Business Week* book of the year and has been greeted by a broad spectrum of commentators as outstanding. The understanding and strategies Diane presents about the new economy and the way work is being transformed have been variously described as "a wonderful antidote to millennium garbage" and the book "that will move the argument forward about how to achieve social well-being."

Mike Hawley: the Drefoos Professor of Media Technology at the MIT University in Boston, USA. Working as part of the prestigious *Media Lab* team with Nicolas Negroponte, Mike is responsible for a project entitled *Things That Think*. This aims to make computers invisible by embedding them in everyday objects, from workplaces and kitchens to clothes and furniture, so that they can support and enrich natural human activities in intelligent and empowering ways
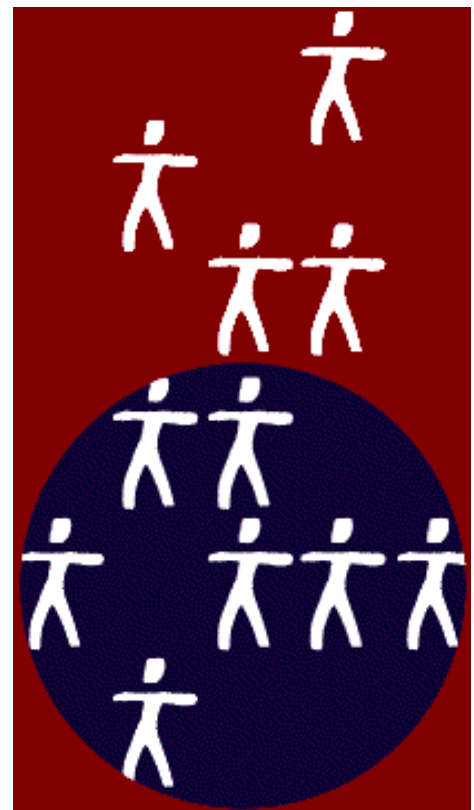
Other top speakers and debaters include:

- Michael Niebel, Special Advisor on New Ways of Working to DGXIII and former Chef de Cabinet to Martin Bangemann
- Marie Donnelly, Head of the Information Society Unit at the European Commission's DGV
- Peter Johnston, Head of New ways of Working Unit at the European Commission's DGXIII
- Birte Weiss, Danish Minister of Research
- Ove Hygum, Danish Minister of Labour
- Henning Dyremose, CEO Tele Danmark
- Willy Bushak, Confederal Secretary. the European Trades Union Confederation
- Ursula Huws, Analytica
- Marie-Louise Knuppert, Confederal Secretary of the Danish Trade Union Congress
- Kim Østrup, Director of IBM Danmark and chairman of The Danish IT Industry Association

The Telework '99 programme provides Europe's main platform for focusing on the technology, socio-economic and policy aspects of new ways of working and sustains the pattern of previous Assemblies as top level, high profile and quality events. It will be structured around both plenary and parallel sessions and workshops, and will include demonstrations as well as an exhibition of technology and workplace innovations as well as a full social programme.

In 1999, special focus will also be paid to the European Union's new *Information Society Technologies* Programme, as part of the Fifth Framework Programme for Research, and especially upon Key Action II concerned with new methods of work and electronic commerce.

Important announcements will be made during an International Press Conference to be held at the end of the first day of the Assembly. All this, plus a full programme detailing presentations and all the top speakers participating, as well as other exciting developments, can be found on the Assembly web-site.[68]

5.3.4   European Telework Week 1999

Now in its fifth successive and successful year, European Telework Week is a framework for everybody throughout Europe to gain additional publicity, attention and synergy by scheduling their events and initiatives within a single time frame during the first week of November. It is more than just the main focus for teleworking and new ways of working in Europe, however, as the growing importance of Telework Week on a global scale is highlighted by the international audience it is attracting.

As previously, European Telework Week is supported by DG XIII of the European Commission and details of this year's core partners who offer vital sponsorship will be made available as they confirm their support. European Core partners in 1998 were: Toshiba, France Telecom, Telecom Italia, Cisco and Siemens.

Telework Week could never exist without all those throughout Europe who organise events, support events or participate in activities organised by others. The focus of media attention for telework on this week makes it possible to ensure that more people become aware of the new opportunities in work and ways of working, every year.

In 1999, the aim is again to address in principle as many people as possible with positive messages about telework.

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[68] http://www.telework99.dk

E urop ean
Telework Week 1999

In order to focus efforts, however, special attention will be paid to
- all Europe's SMEs
- business intermediaries
- European administrations at national, regional and local levels, as these are key in getting telework adopted and in promoting flexible and new ways of working generally
- the media are, of course, essential
- the individual who needs to get a better appreciation of the benefits of the new working environments

Regarding methods, the following will be used:
- the web-site[69] including the newsletter in electronic form, the ETW web-ring with currently 14-15 members, a web-based discussion forum, an events listing routinely up-dated on the ETD web-site[70]
- push technologies such as web-casting (today's Information Day event is being web-cast) enabling people not physically present to link in and be part of the event at very low cost; also NetPresenter which enables people to register their desktops and receive regular messages coming up as a screen saver and updated automatically each time they log-on
- traditional information distribution such as ad-hoc electronic publishing for producing newsletters, brochures, etc., in relatively small quantities for specific events which gets around the costs of mass production and circulation with the inevitable waste; there will also be a paper publication produced just prior to Telework Week in significant numbers and available to everybody attending events, listing all events, highlighting the shortlists for the Telework Awards, etc.

It is important to think about events which are not necessarily traditional but reach out to prospective audiences not only in the big cities. Using the web, for example on-line discussions, can also be very effective. Any and everybody is invited to participate, either in organising or helping to organise an event or simply supporting events.

It is also expected that events and initiatives in Eastern Europe, in the Mediterranean area, as well as further afield will take place during ETW '99.

5.3.5   The European Telework Awards 1999

The European Telework Award Ceremony will take place during European Telework Week 1999, on 5 November 1999 in Brussels. Categories for the 1999 awards are[71]:

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[69] http://www.etw.org

[70] http://www.eto.org.uk/events

[71] http://www.etw.org/awards3.htm

1. Best Example in Large Organisation

Nominees in this category demonstrate a wide uptake of telework, integrated in the way of work within the organisation. Criteria to be considered: breadth of uptake (both in number and in categories of staff included), quality of communications and access to information, when not in the office (both in terms of technical support and organisational provisions), clarity of objectives and measured achievements (e.g. reduction of office space, improved customer service, retention of staff).

2. Best Example in SMEs

Over the last six years most new jobs have been created in SMEs. New technology allows the use of high tech and advanced communications, scaled down to any level of operations. This enables starters and small enterprises to reduce their "time to market" considerably, and supports team working across organisational boundaries, with "open" constituencies, at affordable costs. Elements to be considered are: integration of technology use in business processes, clarity of objectives and measured achievements (e.g. width of markets and networks in which the enterprise operates).

3. Best Supporting Public Initiative

Telework became known to the wider public in Europe during the early nineties, as a potential contributor to the relief of traffic congestion. Before that businesses did apply teleworking techniques, but considered its way of working as part of the corporate culture and/or competitive advantage. Today it is recognised that the flexibility offered by integration of the new technologies enhances both competitiveness and quality of working life, when adopted well. Following this many public institutions have taken positive action towards promoting telework. In this category the impact of the measure on uptake is very important, as well as stimulation of a better understanding of new work opportunities.

4. Best Initiative Supporting the Disadvantaged

On the Internet you see the ability, without being distracted by the disability. The new world of work offers opportunities to previously excluded people, by complementing the available skills of an individual with interfaces that enable much better deployment of those skills than was ever possible before. A major element in this category is proven impact, as well as the potential impact of any initiative that stimulates participation in rewarding work.

5. Best Contribution to Public Awareness

The slogan "Why change the way we work" has made many UK inhabitants rethink their way of working. This Award winning slogan of British Telecom is just one example of a wide range of advertising and awareness campaigns that are contributing to consciousness about the changes that are upon us, and are triggering uptake of new technologies. Originality and effectiveness are the most important factors here.

6. Best Supporting Technology or Service (no presentation)

New technologies and services, enabling us to work where we want, are coming on the market every day. In this category there are again only winners, although there is just one first prize, all nominees will gain the attention of many teleworkers in Europe and beyond, tuning in for the Telework Week Awards.

5.3.6   Other initiatives

Other networks exist at both regional and national levels, bringing together people to discuss and explore new ways of working. For example, national Telework Associations organise annual and other events (see Annex A5.4 for list of contacts), and commercial event organisers initiate thematic events[72].

Preparations are in hand for the Seventh European Assembly on Telework and New Ways of Working in the year 2000 in the UK. More information will be announced soon.[73]

And there is much more. Telework is now firmly on the conference agenda as a subject of continuing interest, in an environment that has become more stable, and serving a growing community of interest. This is substantiated by the fact that multiple, large, annual events on the subject seem to be commercially viable (including sponsorship from private and/or public organisations).

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[72] see and use the up-to-date events calendar on http://www.eto.org.uk/events for all events concerning telework, teletrade and telecooperation locally, nationally, and at European and international levels.

[73] see http://www.eto.org.uk/events

Annex 1: European Telework Week 1998: summary of events and initiatives

See section 3.17.4 for a summary assessment of ETW '98[74].

A1.1 Short summaries by country

Austria
9 events, over 400 people in total.
Press and media: articles in 5 major newspapers
Neue Kronen zeitung 2,800,000 circulation (40% over 18 years)
Der Kurier 800,000 circulation
Local and regional ones as well.
TV: ORF-Vienna 5 minutes report on the 7 pm news.

Belgium
2 events:
BTA annual meeting 60 attendees, senior representatives of administrations, companies, and political entities.
European Telework Awards 150 attendees
Press and media: articles in the major newspapers
Le Soir
La Libre Belgique
L'Echo
TV/Radio: Interviews for RTBF & BFM Radios

Denmark
2 events, over 100 people mainly decision makers in Copenhagen and Aarhus
Press and media:
Jyllands Posten: 4 articles, 183,500 circulation.
Aarhus Stiftstiende , 1 article, 88,000 circulation daily.
Computer World, 1 article, 28,000 circumation weekly.
Tele Danmark magazine, 1 article , free to 2.2 Millions households.
TV: DR 1 (main channel) 2 minutes story on Aarhus meeting

Finland
9 events, over 480 people
Press and media:
press release in STT (National News Agency)
Taloussanomat (national business journal), 2 articles,
Satakunan Työ, Länsi-Suomi and Kouvolan Sanomat and others local and regional newspapers
TV/Radio interviews in Radio Savo and Radio Suomi, Oikea Asema and the local TV channel Porin Paikallis

France
8 events, over 1100 people
Press and media:
telephone cards were printed

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[74] see also http://www.etw.org/98

with a flavour of telework at INTEROP, many people in the ICT branch were reached.

Greece
1 event (Island of Crete) over 100 people, international attendance, large delegation from Finland, visitors from all over Europe.

Ireland
3 main events, over 230 people.
Large survey on telework in large corporations,
Large survey on telework effects on Dublin's traffic.
Press and media:
articles in Irish Times, Sunday Business Post, Sunday Tribune, Examiner, Irish Independent
Radio: radio campain by Telecom Eireann, 8 minutes slot on Tipp FM, local radio
TV : 7 minutes on Tech TV, 160,000 audience.

Italy
18 seminars, conferences, training courses, etc., over 2,500 people
large ETW98 opening Session in Rome on 30/10/98 (over 250 participants)
Press and media:
over 100 different articles, radio and TV interviews in local and national media reached at least 10 million people.
T.V.:   RAI produced a 30 minutes special programme to be broadcasted in US, Latin America and Northern Europe.
TV news addressed teleworking
Others: more than 2,000 CD on national and international Telework matters were distributed.
Italian version of the European Telework status report were published and
distributed.

Netherlands
2 seminars, over 100 people.
Apple Expo (over 4 days) with over 9,000 visitors.
Dutch Telework Awards, over 100 people attended.
Press and media:
radio: live interviews with the awards winners,
1 week later an 1 hour special on Telework.
press releases to more than 230 press contacts.

UK
13 events, over 1,000 people
Press and media:
articles in Daily Telegraph, Times, Mail on Sunday.
radio: BBC4 Radio Humberside, Southern Countries Radio,
Campain on Classsic FM. 6.5 hrs of airtime.

A1.2 European Telework Awards 1998

A1.2.1 Overview

A glimpse of the strength and diversity of telework initiatives in Europe
was on show at the European Telework Awards ceremony in Brussels on November 6th, [1998] as large European corporates shared the spotlight and the prizes with innovative micro-enterprises and community ventures.[75]

The Awards, now an established feature of European Telework Week (Nov 2nd-9th), attracted entries from across the European Union. Introducing the awards ceremony, Peter Johnson of the European Commission DG XIII stressed the importance of the new ways of working, made possible by information and communications technologies (ICTs). "We need to learn from best practice. The European Telework Awards ceremony enables us to learn from the best in Europe," he said.

Teleworking, usually defined as remote or distant working made possible by the use of ICTs, encompasses a wide range of practices including home-based working, mobile working and the use of satellite offices and telecentres. Peter

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[75] This overview is written by journalist Andrew Bibby: andrew.bibby@mcr1.poptel.org.uk

Johnson told the Awards ceremony that in total about four million people were now teleworking in European Union member states. "The number is growing very rapidly," he said. "Ten million people will be teleworking in one form or another by the year 2000."

Twenty-two companies and organisations from nine countries were short-listed for the European Telework Awards ceremony and had the opportunity to briefly explain their use of teleworking before an invited audience at the Palace Hotel in Brussels. The event, compered with flair by Belgian television presenter Daisy Van Cauwenbergh, was also simultaneously web-cast over the Internet.

The variety of teleworking now taking place in Europe was reflected in the short-listed entries. Among larger companies represented at the ceremony were BMW for its TWIST teleworking programme involving 400 employees, Telecom Italia Mobile for its innovative use of laptops for field-based technicians and Dutch and Danish telecom operators KPN and Teledanmark for major recent telework campaigns. British Telecom showed its striking TV advertisement on the theme 'why not change the way we work?'.

Presentations from smaller enterprises making creative use of telework included those from Dutch IT firm Vertis, Scottish call centre training centre and operator GCS, and the Danish company Excel. Excel recently opened a satellite office in Billund, saving some of its employees the task of commuting over sixty kilometres to its head office in Herning.

KITE, a small enterprise based in a rural area of northern Ireland which uses ICTs to work for US clients, was another entrant. KITE's director Michael McCaffrey spoke of the way that work could now 'follow the sun' around the world.

Two ventures which aim to take telework opportunities to people with disabilities were shortlisted: the Portuguese THINK programme, and the Italian programme CSELT. The European Telework Awards also included an entry from the young people of Piquecos school (Tarn-et-Garonne, France) for a set of telework-related designs used on telephone cards in several European countries.

This year the awards attracted a very strong bodies of entries from public authorities and government bodies. From the eleven submitted, the three entries shortlisted were the Telearbeit im Mittelstand initiative aimed at promoting telework to smaller enterprises and run jointly by the German federal government and Deutsche Telekom, the use of flexible working undertaken by Surrey County Council (UK) and the Fueva project operating in the Spanish region of Castilla y Leon.

As befitting a competition celebrating innovative use of technology, the voting for the European Telework Awards was itself innovative. The entries were carefully considered by a small team of telework experts but their votes were balanced by votes cast in advance of the ceremony by visitors to the Telework Awards web site, and by the audience at the ceremony itself.

The winners were Telecom Italia Mobile (best contribution to European competitiveness), BT (best advertising campaign), KITE (most entrepreneurial use of telework), CSELT (most innovative use of technology), Fueva (best public initiative), THINK (best contribution to European sustainability) and Teleworker magazine (best single article or programme).

The European Telework Awards were a highlight of this year's European Telework Week, which included events and activities across the European Union. Peter Johnson of the European Commission DG XIII put these events into a wider context when he reminded the Awards ceremony audience that the EU's forthcoming Fifth Framework Programme for research and technological development will include further opportunities to explore the economic growth and job creation possibilities of the information society. "We have an exciting opportunity for Europe to become the world's showcase," Mr Johnson said.

European Telework Week 1998 was supported by organisers and sponsors all over Europe. The framework for co-operation and the European Telework Awards contest were made possible by the European Commission DG XIII and its' Core Partners:

A1.2.2   The Winners of the 1998 European Telework Week Awards

Best Contribution To European Competitiveness
TIM (Telecom Italia Mobile)

At the beginning of 1997 Telecom Italia Mobile (TIM) faced the fast growth of the mobile communication demand in the dynamic and extremely competitive Italian market. Mobile communication customers were becoming not only larger and larger, but also more demanding, especially in terms of service quality. TIM was forced to respond to the customers' expectations by efficiently controlling the plants and ensuring a high service level for the equipment in place all over the country. This improvement has been achieved by gradually introducing a Telework Program for the technicians of the Operation & Maintenance (O&M) group Network Department starting from December 1997.

The Telework Program objective was to improve the efficacy and efficiency of the Network Management processes by decoupling the technicians from the administrative centers and freeing them from the burden of daily checking in and out from the Regional Centers (Presidi Territoriali Regionali, PTR). With the telework implementation, staff clocks-in from home remotely and immediately starts working on the BSC and BTS transmission equipment in the assigned area.

With the Telework Program TIM is experiencing several benefits such as travel reduction, increase of the number of daily operations per technician, increase in the number of programmed activities, general reduction in the operational expenses and greater satisfaction of the work force.

Best Advertising Campaign
British Telecom

For some weeks a young girl in a bright yellow raincoat has been a familiar face on our television screens.

As part of BT's Why Not Change The Way We Work campaign, nine-year-old Nicola Bland has been questioning working practices from 'why do we use so much paper?' and 'why do we travel so far just to talk about work?' to 'why is my daddy never home at bathtime?'.

While the primary aim of the campaign is clearly to promote BT's products and services such as ISDN, email and 0800 lines, it has the potential for a much greater impact on work culture in this country. Dominic Owens, head of marketing communications for BT business, said: "We want to challenge businesses to take a fresh look, through the innocent eyes of a child, at how we all work.

"Why, for example, do we spend hours travelling miles to meetings when we could hold a videoconference instead?"

"The way we work is crazy and it doesn't have to be this way any longer. People work in ways they do because they always have but we no longer need to.

"The rapid pace of technology is revolutionising the world of work and many businesses are already reaping the benefits of it." Many companies have already begun to reassess the way they work - placing more emphasis on flexible working and teleworking and investing in new technology which will enable employees to work remotely.

But how is BT itself tackling the issue? Workstyle 2000 development manager Neil McLocklin says BT is challenging traditional working practices and remoulding them to fit into a changing world and take the company into the next millennium.

 He said that currently within the company, 825 managers teleworked for two days a week and the hope was that within the coming year that figure would double.

 "There are four main reasons for this," McLocklin said. "People actually want to do it. We have done a lot of surveys and found that people like working this way. "People can work better in many ways. The normal scenario is for people to telework for two days a week. We have found that when people are able to do their quiet work [writing reports etc] at home, it improves productivity because they manage their time better. Also it saves us money and it enables us to practice what we are preaching."

Most Entreprenurial Use Of Telework
KITE (Kinawley Integrated Teleworking Enterprise Ltd)

 Sheila McCaffrey - Managing Director, Michael McCaffrey - Director

Kinawley is a village located in a rural part of Northern Ireland, close to the border with the Republic of Ireland. The population of Kinawley is 700 persons (1991 census) 37.4% of whom are under the age of 20, with a greater proportion of males, as it is common in declining rural areas. Kinawley suffers from a high level of socio-economic deprivation and is among the highest in Northern Ireland. The region is characterised by low population density, low inward migration and high out-migration with a consequent decline in the number of households, caused primarily, by the lack of job-opportunities in the area. Unemployment in the area is higher than the average for Northern Ireland (20.8% vs 15.7%) with only 36.4% of the population being economically active (vs 42.2% in Northern Ireland).

As there is no worthwhile manufacturing sector and very little service industry, its population depends on low-value-added farming (in most cases) or on travelling outside the area to work, and its infrastructure is poor, inevitably, therefore, the area contains pockets of quite severe deprivation. To address this trend KITE was set-up to create an industry in the information technology sector based in Kinawley. KITE has been actively involved in promoting the concept of Teleworking in Northern Ireland. While researching the idea of establishing a Telecottage in Kinawley, the company quickly identified the potential for Teleworking as an opportunity for the employment of women in rural areas. KITE has a detailed working knowledge of the county, its capacity and its potential for growing the economy of the region.

The objectives of KITE have been the ability to put forward a positive and new image of Kinawley and its environs. The establishment of KITE has meant that a new image of this rural and isolated settlement has been brought to the forefront. The technology era combined with a day care facility has meant that Kinawley has become a shinning new example of what can be achieved in a rural area. Economic regeneration with a social focus has contributed to the development of the area for the benefit of all that live here.

Achievement of the social objective has been targeted by acting in the following main directions which are closely related:
Establishing a "local" teleworking facility
Childcare
Training
Equipment and infrastructure
Finding a market for the services
Community relations
Social inclusion

Most Innovative Use of Technology
CSELT

The companies of the Telecom Italia group have been the first in Italy to develop integrated solutions and to set up trials in order to allow disabled people to telework from home or from satellite centres. Different modules have been developed in internal, national (MURST – Ministero dell'Università e della Ricerca Scientifica) and European (TIDE, ACTS) projects. Most of these solutions are based on the integration of innovative voice technologies for the Italian language with commercial telecommunication applications.

Different application modules can be integrated in order to allow the disabled professionals access to different telecommunication services and terminals. The teleworking platform alleviates common access problems to telecommunication of different disabled users groups, such as motor impaired, visually impaired and hearing impaired. Motor impaired people are allowed voice control of web browsers and other Internet services, of videoconference and co-operative working applications, and of house and call centres phones. Visually impaired people are allowed vocal access to information in the Web, to electronic newspapers, magazines and data bases. Hearing impaired people can use a modified PC videoconference application featuring only visual signalling and a double camera with two fixed views of the face (for lip reading) and half-length (for signing).

The possibility to work from home or a satellite centre can open new opportunities for disabled professionals for remaining or entering in the work market. Indeed the introduction of telework can offer a more flexible organisation of work and reduce the need for moving. Rigid working hours, difficult daily displacement, architectural barriers at the working place often create difficult problems for professionals that are or have become disabled. Teleworking can be a solution more compatible with health and personal assistance needs. Obviously teleworking must be organised in a sensible way in order to avoid social and professional exclusion, as demonstrated by the TWIN project (co-ordinated by CSELT, supported by Telecom Italia and funded by the EC under the ACTS accompanying measures).

CSELT and Telecom Italia have long ago initiated an action aimed at creating a platform that could promote disabled teleworking, alleviating the access problems to common telecommunication services and terminals. We were interested in finding real practical applications due to the Telecom Italia group culture and to the internal labour agreement asking for an active promotion of teleworking.

Most solutions were found by the integration of innovative speech technology with telecommunication applications, due to the deep experience of CSELT in this field and the availability of high quality proprietary speech technology at CSELT (best Italian products for speech synthesis and speech recognition in phone environment).

The most innovative modules that can be integrated in the teleworking platform include:
A proxy server performing automatic, user configurable, modifications to HTML pages in order to allow voice control of any Internet browsers by motor impaired persons.
A voice controlled videoconferencing and co-operative working application
A videoconference application for signing and lip reading, with only visual signalling and special camera settings for the hearing impaired
A centralised service allowing voice dialling by a low cost commercial phone.
A voice controlled application for managing telephone lines by disabled operators
An integrated environment for vocal web and electronic documents access for visually impaired users

The integrated teleworking platform have been tested with real users in real working situations, allowing an iterative refinement of requirements and functions. The use of a user centred design approach allowed to identify most important technical features, the preferred interaction techniques, and the desired cost levels from the final user point of view.

Best Public Initiative
FUEVA: the project "Teleworker"

The Foundation University-Enterprise is proud to present their project "Teleworker" to the Telework Awards 1998. The award category selected is number 5 "Best Public Initiative", as the project has been developed for and together with the regional government "Junta de Castilla y Leon".

The project represents the basic tools for obtaining know how about teleworking, the bases being the CD-ROM, and expanding and amplifying the information and services offered in the Virtual Telework Association, something completely new and innovative in our region. The reason for which, in our opinion, the project should be selected is the fact that it offers information for persons who do not know about teleworking, as well as for persons already teleworking.

The information is also of value within the regional government itself, as teleworking is considered one of the new ways of working, mentioned in the regional employment plan.

The Foundation University-Enterprise (FUEVA) in collaboration with the Directorate General for Employment of the regional government of Castilla and Leon (Junta de Castilla y León) has realised two different type of actions within the framework of the project "Teleworker".

The project offers a wide range of services related to teleworking to companies, mainly SMEs, and individuals of the region, with the aim of disseminating, promoting and stimulating the implementation of teleworking practices in the region.

The two resulting products are complementary in the way that the CD-ROM pretends to introduce the term teleworking, its advantages, worries, etc. to the general public. The Virtual Association for Teleworking pretends to offer a more detailed information, as well as a consultancy for the implementation of teleworking, being in that sense an extension of the CD-ROM.

The results of the action concerning the development of a CD-ROM on teleworking has been the realisation of a CD-ROM, which includes, in an easy accessible way, all kind of information related to teleworking and which is of interest for the target public.

The Virtual Teleworking Association of Castilla and Leon is the creation of an interactive web page, implemented in Internet, and accessible through the server of FUEVA, which offers al types of information and services, some freely accessible, others only accessible for members. The address is: http://www.fueva.uva.es/avit

Best Contribution To European Sustainability
THINK (Towards Handicap Integration Negotiation Knowledge)

THINK – Towards Handicap Integration Negotiating Knowledge – is a project that, taking into account the difficulties of the physically handicapped, using the methods made available by the new Information and Communication Technologies – and, inherently, through telework – aims to develop their capabilities in this area, helping them to market their services and aiding them in this way to achieve full professional integration.

 The main objective of this project on the short/medium term consists in the professional integration of twenty handicapped in the first two years, making them productive, profitable and self-sufficient in areas such as accounting, translations, word processing, programming and technical assistance to computer systems, amongst others.

This employment project, started on April 1st 1997, has a unique feature of being promoted by a consortium of private companies, without public financing.

It is within the consortium's plans to expand into other European countries using the same techniques proven and tested in Portugal.

The experience of the project THINK/ PORCIDE, due to its originality and its employment potential, linking the usage of the features of the Information Society with the social-professional integration of citizens suffering from a

handicap, is an exemplary practice regarding the capacity of marshalling and self-organisation of the Civil Society with the aim of the creation of work and employment posts with a future.

Participants:
TELEMANutenção – Project leader and provider of the know-how
Portugal Telecom - Telecommunication infrastructures
Telepac - Internet communications
Microsoft Portugal - Software
Hewlett Packard Portugal - Hardware
Edson Comunicações - Advertising and Marketing

Target Group: Disabled people, less than 40 years old with university background.

Best Single Article Or Programme
Teleworker Magazine
Print run 5,000

Extracts circulated on the Internet via on-line version TCA-OnLine and now available in partnership with BT on BT's workingfromhome website. The magazine is produced for members of the British Telecottage Association, but is also on sale for a wider audience.

In order to demonstrate the added value of the magazine, the April/May 1998 edition was submitted to the jury. It carried some excellent articles whose sheer variety and breadth mean that the entire magazine should qualify for the best article. This issue contained the following significant articles :
TCA and UK Telework Platform lobbies parliament in the House of Commons (week long)
Students rebel against lessons via videoconference
Mobile teleworkers advised not to phone and drive
Call Centres are flourishing in the UK
Transport
Telework and Traffic mangement
Report shows that roads reduce economic activity
The Teletourers - new high tech caravans for the tripping teleworker
Telecottages and Telecentres
The most remote telecottage in the UK
The Telecottage in the Railway Carriage
Stoke on Trent high tech centre
Technology
Electronic News services - Newsdesk
Ian Simmins and the ETD web site
Training
University for Industry
Training for call centres
Disabled people trained at home
Organisation
Local council recruits teleworking programmers
Surrey County Council teleworking
Regus 'Touchdown centres'
Telecottage Map
Technology Feature : What Every Teleworker Wants
My favourite things - spoof technology gizmos

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Annex 2: Telework related projects at European level

A2.1 Commission contacts

IST (Information Society Technologies) programme
Commission contact:
Jacques Babot
New Methods of Work
European Commission DG XIII/C 1
Tel: +32 2 296 3594
Fax: +32 2 296 2980
E-mail: telework@bxl.dg13.cec.be

GAT Telework Chain Secretariat:
Christian van Asbroeck
Tel: +32 2 770 6259
Fax: +32 2 770 7952
E-mail: vanasbroeck@compuserve.com
http://www.eto.org.uk

The ADAPT and EMPLOY Initiative
Michel Laine
European Social Fund
Tel.: +32 2 295 81 38
Fax: +32 2 296 62 80
E-mail: gerhard.braeunling@dg5.cec.be

Article 10 of the ERDF
Pentti Lahtinen
European Commission DG XVI
Tel   +32.2.299   31   61
Fax +32 296 24 73
E-mail: Pentti.Lahtinen@dg16.cec.be

The LEADER Initiative
M. van de Poele
LEADER
European Commission, DG VI/F1.1
Tel.: +32 2 295 61 78
Fax: +32 2 295 10 34
E-mail: catherine.combette@dg6.cec.be
URL:
http://europa.eu.int/en/comm/dg06/index.htm

The ISIS (Information Society Initiatives in support of Standardisation) Action
ISIS Secretariat
European Commission, DG III/B3
Tel: +32 2 296 0109
Fax: +32 2 299 1675
E-mail: isis@dg3.cec.be

Trans European Telecoms Networks
Yvan Capouet
Trans European Telecoms Networks
European Commission, DG XIII/A.3
Tel.: +32 2 295 40 58
Fax: +32 2 295 10 71
E-mail: yvan.capouet@bxl.dg13.cec.be

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A2.2 Projects in alphabetical order

<u>Note</u>: This list includes most of the projects known to have an interest in the new clustering activity bridging between the Fourth and Fifth Framework Programmes for projects relevant to the New Methods of Work theme of the IST Programme (Fifth Framework Programme).

45 +	**ADAPT Initiative**

The objectives of the project are to develop training and consulting methodology. The information technology training needs of SME employees, over 45 years of age, will be studied, and a training programme to increase their capabilities in the use of IT and telework will be put into place. The project aims to improve SMEs' ability to capitalise on the new opportunities brought on by the information society, whilst preventing the exclusion of older employees by giving them capabilities to operate in an environment based on information and the utilisation of information technology.

The project is going to develop and test different approaches for providing learning and development, based on needs analysis and individual development plans for identified target groups in a number of pilot SMEs. The results / experiences from the three national partner projects - Belgium, United Kingdom and Finland - will form the basis for a guide on best processes, methods, means and practices.

<u>Project period:</u> 1.1.1998 – 31.12.1999.

Contact: Adulta Institute of Further Education	*Marjukka Rehumäki*
Postikatu 8 B	*Tel: +358 9 2719 0241*
FIN-04400 Jarvenpaa	*Fax: +358 9 2711 441*
FINLAND	*E-mail: marjukka.rehumaki@adulta.fi*

AC-DIRECT	**AC-DIRECT**	Article 10 of the ERDF

The aim of AC-DIRECT in the region of Västerbotten in Sweden is to create a regional network infrastructure for public and private organisations with a strong focus on SMEs and to inter-connect companies and public authorities at low cost and offering at the same time an affordable connection to other regions and countries via a common internet gateway. AC-DIRECT's impacts have been to:

Enhance effectiveness of marketing and export capabilities of SME's

improve the provision of public services

stimulate telework possibilities

facilitate the efficiency of public administrations

<u>Project period:</u> 11-01-96 – 31-10-98

Contact:	*Rolf Wännström*
Umestan Företagspark	*Tel.: +46 90 71 80 00*
903 47 UMEÅ	*Fax: +46 90 71 80 05*
SWEDEN	*E-mail: rolf.wannstrom@consitor.se*

ACTIVE	**ACTIVE multiplier project**	**LEONARDO-DA-VINCI Programme**

The ACTIVE multiplier project aims at favouring access to employment through teleservices (or teleactivities) for the unemployed, including disabled people. The main objective is to train in tele-skills in order to provide teleservices, e.g. how to conduct a telephone conversation in order to ensure customer satisfaction. Conception, development and validation of training modules are made in close partnership with teleservice businesses in the 3 countries involved in the project: France, Germany and the Netherlands. The trainees are prepared to work at a distance from customers, within call-centres or teleservices departments within companies. The main objective is to give them the "tele-skills" they need to find a job at the end of the training, or even before the end. Being trained in distance working techniques does not automatically lead to employment. Therefore, trainees not being trained in teleworking methods but on the new communication skills required by the labour market. There are already good placement results.

<u>Project period:</u> December 97 – April 2000

Contact ACTIVE:	*Pierre Olivier, Director*
Centre de Réadaptation Professionnelle et Fonctionnelle de	*Tel.: +33 1 64 45 15 15 / 33 1 64 18 74*
Nanteau-sur-Lunain	*Fax: +33 1 64 29 05 17*
BP 34	*E-mail: coserpf.nanteau.p.plivier@wanadoo.fr*

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77 792 Nemours Cedex, France   *URL: http://www.cos-crpf-nanteau-fr.com*

ACTSLINE	Marketing ACTS results	ACTS Programme

ACTSLINE aims to act as a marketing department for the ACTS programme. It will identify which results will interest actors outside the programme, develop customised packages of information for each group of actors and actively promote the ACTS messages to them. In addition it will seek out packages of ACTS technology which are almost ready for commercial development and encourage groups of interested actors to develop roadmaps for the final pre-competitive steps. Link to Telework/Tele-cooperation:

ACTSLINE will package results from the ACTS programme for specific constituencies, including telework, new ways of working, e-commerce, etc. The project will gather market issues and requirements in this area, with support from the National Coordinators of the ETD project.

Project period: March 1998 – January 2000

Contact ACTSLINE: *Hill Stewart; Tel: +392 4388 8030*
Italtel Central Laboratories   *Fax: +392 3351 0146*
Castelletto di Settimo Milanese   *E-mail: info@actsline.infowin.org*
I- 20019, Italy   *URL: http://www.actsline.infowin.org*

ASIS	Alliance for a Sustainable Information Society	Acts Programme

The objective of ASIS (Alliance for a Sustainable Information Society) istodemonstrate how best sustainability can be supported by inducing anappropriatedirection to the development of the Information Society. This will involvecreating a climate of understanding and commitment. The Allianceencourages thevery wide participation of public and private organisations that isrequired towork towards the new ways of working, playing and living that comprise aSustainable Information Society. This society may be seen as the next stepalongthe path towards a fair, fulfilling, prosperous and sustainable world.In the action group "Homes and Workplaces of the Future" ASIS examinespossibleimmaterialisation of activity and of consumption in both the workplace andthehome. The significance for this Action Group is that most "needs" are infactnon-material. Telepresence techniques can help to reduce the material useinvolved in satisfying these non-material needs.

Project period: March 1998 – February 2000

Contact: *Dr. Thomas Schauer*
Research Institute for Applied Knowledge Processing   *Tel.: 49-731-5018633*
Helmholtzstrasse 16   *Fax : 49-731-501999*
D-89081 Ulm   *E-mail: tschauer@faw.uni-ulm.de*
Germany   *URL: http://asis.jrc.es*

Audis	Multipurpose Auditory Display for 3-D Hearing Applications	Esprit Programme

Audis is developing and testing a multipurpose AUditory DISplay for 3-D Hearing Applications. Techniques of "virtual acoustics" are being used to enhance the audio channel to significantly enhance what can be conveyed to application users. There are many potential applications, especially in the context of future wearable and personal systems. In modern man-machine interfaces, the amount of visual information presented to the user has increased to such a degree that the limits of the information-processing capacity of the visual channel have been reached: in case of advanced applications or critical situations, this has introduced the risk that the visual channel is often overloaded, which may have important consequences on efficiency and safety. Given the effort spent to optimise visual displays, it is remarkable that relatively little attention has been paid to the auditory channel. In fact, the ergonomics of auditory displays is relatively poor. However the quality of these displays can be substantially improved by using techniques developed within Virtual Acoustics, which is aimed at creating realistic virtual auditory environments using sounds presented through headphones.

The AUDIS partnership aims to conduct the necessary research for the development of a multipurpose auditory display, in order to definitely confirm the interest of 3-D sound as a powerful and flexible man-machine interface in terms of improved comfort and situational awareness for the user, higher intelligibility of communication channels, improved efficiency and reaction face to abnormal situations.

Contact: *Gerard Reynaud*
SEXTANT Avionique   *Tel + 33 5 56 13 52 09*
Rue Toussaint Catros 91   *Fax + 33 5 56 13 50 54*
F-33166 Saint-Médard en Jalles   *E-mail: Reynaud@sextant.thomson.fr*
France   *URL: http://cordis.lu/esprit/src/22352.htm*

BIC	Blueprint for Interactive Classrooms	Telematics Application Programme

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The Blueprint for Interactive Classrooms project is about designing and building interactive classrooms for teaching distant learners usingvarious audio-visual technologies which allow teachers and learners tointeract over a variety of telecommunications networks in a cost-effectiveand pedagogically sound manner. This project which was supported from 1996until 1999 involved university partners in Finland, Belgium, France, Italyand Ireland who each developed tested and are now in the process ofdemonstrating and exploiting the facilities which have been developed ineach of their university sites. In order to make this information morewidely available, the consortium has both published a handbook andmaintains a highly active and informative web site which offers ahelp-desk function. The handbook entitled "Classrooms for DistanceTeaching & Learning: A Blueprint" provides practical information andadvice on setting up and using interactive telepresence classrooms forteaching purposes. It is published by Leuven University Press and costs1250 BEF (about 30Euro +P&P) and gathers much of the experience of thepartners involved and provides guidelines and advice to both designers andusers of such systems. The web site address ishttp://www.linov.kuleuven.ac.be/BIC and here you can find out more aboutthe project and directly contact the partners if you would like moreinformation

Project period: 1/1/1996 – 31/8/1999

Contact:	*Sally Reynolds*
Audiovisuele Dienst	*tel: +32 16 329250*
K.U.Leuven	*fax; +32 16 329298*
Steengroevenlaan 3 B 3	*email: sally.reynolds@atit.be*
3001 Heverlee, Belgium	*http://www.linov.kuleuven.ac.be/BIC*

BOURBON	Broadband Urban Rural Based Open Networks	**ACTS Programme**

The main goal of the technical work in the A.C.T.S. Bourbon (BrOadband Urban Rural Based Open Networks) project has been to specify, set up and run individual testbeds in each participating country for the support of real SME field trials. This work has been done in several testbeds and (pre)commercial heterogeneous broadband ATM/IP and narrow band ISDN environments in Ireland, Finland, France, Austria, Germany, Scotland, Italy, Greece and North Holland. To achieve this, the work has included several phases: network architecture planning, network implementation and network operation and development.

The project has found that SMEs have a much larger hurdle to cross when utilising ICT and broadband technology than corporates. This is mainly because they often don't have the same facilities or requirements as corporates. There is however an undergoing change from an industrial society to the information society in which SMEs play a very important role. Information society technologies increasingly pervade all industrial and societal activities and are accelerating the globalisation of both economies, in particular by providing SMEs with affordable access to the global marketplace and societies. Several existing and future European research projects and programs have listed the importance of increasing the competitiveness of SMEs as one of the most important objectives.

Project period: The project concludes in August of 1999.

Contact:	*Project Manager, Jim Clarke*
Lake Communications Ltd.	*Tel: +353 71 55068*
Beech House	*Fax: +353 71 55069*
Dublin 24	*E-mail: jclarke@lake.ie*
Tallaght, Ireland	*URL: http://www.lake.ie/*

CAFÉ MONDIAL	**Communication Applications for Education, Multi-user Open Network Design, Infrastructure and Logistics**	**Telematics Application Programme**

CAFE MONDIAL was a project funded by the Urban and Rural Areas sector of the EU Telematics Applications programme with the aim to develop teleservices for European citizens. CAFE MONDIAL provides a logistics and infrastructure for virtual classrooms, electronic commerce, electronic consultancy, and community networks based on an architecture of WWW, Intranet linked to databases. During the project a number of telematics resource centres were set up at major sites in Germany, Ireland, Spain, and Sweden.

Project period: Jan. 2. 1996 – Jan 1. 1999

Contact:	*Jolande Leinenbach, Tel.: +49 6872 91024*
Youandi Communication Network GmbH	*Fax: +49 6872 3041*
Merziger Strasse 1	*E-mail: jleinenbach@cafe-mondial.de*
D-66679 Losheim am See, Germany	*URL: http://www.cafe-mondial.net*

Cesar	**Collabooration Environments and Service Architectures for Researchers**	**Esprit Programme**

CESAR will provide a comprehensive toolkit for asynchronous and synchronous multimedia collaboration based on Internet and World Wide Web technology. The project will focus on the assembly and integration of state-of-the-art technology to enable a smooth transition between asynchronous and synchronous modes of cooperation, closely integrated into the normal working environments of the users.

In particular, the CESAR toolkit will provide cross-platform interoperability which is required in trans-European research projects. CESAR will provide services such as session management for the integration of different synchronous collaboration tools, and support for multimedia publication and real-time presentation. Furthermore, CESAR will extend the currently available functionality of the WWW with new services such as notification of users' presence and activities.

The project is based on previous research and development activities of the project consortium, in particular on the BSCW Shared Workspace System as developed within TAP's CoopWWW project which has already today attracted several thousand users, many of whom from the European research community.

The project is focused on user involvement. In the first project phase an initial tool set will be used in a series of field tests within user groups which will apply the tools for real tasks within their ordinary domains of work. This allows determination of user requirements from practical experience rather than from abstract analysis. In the subsequent project phases the tool set will be enhanced and extended in short feedback loops with the user groups.

Although primarily focused on the requirements of the European research community, the CESAR toolkit will be exploited in a much broader market area as a general, cross-platform, WWW based collaboration system.

Contact: *Wolfgang Appelt*
GMD-FIT   *Tel: +49 2241 14 2326*
Sankt Augustin D-53754   *Fax: +49 2241 14 2889*
Köln   *E-mail: Wolfgang.Appelt@gmd.de*
Germany   *URL: http://www2.echo.lu/telematics/research/cesar.html*

CITRONE	**Customising Interfaces Through Three-Dimensional Reconstruction of Objects in a Network Environment**	**Esprit Programme**

The project aims to develop a 3D Face Digitising system based on Computer Vision Techniques.Currently, 3D digitising technologies are based on cumbersome, expensive devices that are not at the hand of common users. This fact has discouraged the use of 3D digitising in many applications. Citrone system however, will concentrate its efforts on the development of a software only tool capable of providing real-like 3D face models of the user. Once those models are obtained, they can be animated using motion capture data obtained by third party components. The result is a realistic 3D character that is able to talk and perform as close to the original model as current technology allows.

One of the key points is the strict requirement imposed to the system so that any user without any kind of special training is able to stand a digitising session at home. It is also important to notice that Citrone does not require any hardware device other than the ones commonly available for average users. Digital photo cameras, low cost scanners and frame grabbers are all suitable devices for a successful session. Citrone provides a complete solution to low cost face digitising. For that reason an Internet trading service has been developed. The user will be able to purchase his digitised 3D models from home. Several applications are foreseen for the system: Game Customisation, Live shows, Information desks, Multimedia, Education.

Project period: 15 November 1998 – 4 June 1999

Contact: *Tomás Rodríguez García*
Organisation   EPTRON SA   Tel + 34913838125
C/ Caleruega 79 3 B   *Fax + 34913838864*
28033 Madrid   *E-mail: eptron@eptron.com*
Spain   *URL: www.eptron.com*

COBIP	**Telework Co-ordination Services for Co-operative Business Processes**	**Telematics Application Programme**

The project COBIP aims to demonstrate the use of workflow tools in the management of telework decentralised activities to enhance work productivity, and to support the management of virtual departments and teams through telework, by providing the adequate teleworkers support services.

COBIP focuses on solutions for small and medium sized enterprises. The system is built on the Windows NT platform using Internet-technology and distributed architectures (TINA / CORBA) on the top of broadband

networks. Telework interaction is based on standard software video-conferencing services. A digital library is provided allowing the storage and retrieval of multimedia documents handled and exchanged by the teleworkers.

Telework will only achieve its full potential, if attention is given to the fact that business processes are normally co-operative processes. Currently there is no co-ordination-tool with specific planning functionality for this purpose. In this project we address these issues by a specific business process model, oriented for the implementation of decentralised structures and the support of its management. On the methodological basis of this specific model we develop and implement telework co-ordination services for model execution as well as planning and monitoring functionality including a module for flexible time management of teleworkers.

Project period:

Contact: *Dipl.-Kfm. Jörg Goletz*
INTERFACE Gesellschaft für DV, Logistik und *Tel.: +49 911/980 8000*
Unternehmens-organisation mbH *Fax: +49 911/980 8018*
Zollhausstr. 95 *E-mail: cobip@iface.de*
D-90469 Nürnberg *E-mail: jgoletz@iface.de*
Germany *URL: http://www.cobip.com*

Cowork	**COncurrent project development IT tools for small-medium enterprises netWORKs**	**Esprit Programme**

The COWORK project is targeted at developing a new software tool enabling Small and Medium Enterprises (SMEs), working in the mechanical sector, to cooperate in a distributed engineering environment to dramatically save time and reduce products engineering costs. This objective may be reached by encouraging SMEs enterprises to systematically apply Concurrent Engineering and Co-design techniques, duly supported by a new specially-conceived software.

Project period: 1 October 1997- 31 March 2000

Contact: *Paolo Onesti*
DemoCenter s.c.a r.l. *Juan Antonio Martín*
Italy *Tel. : 34 943 206744*
Or *Fax : 34 943 202757*
Fundación Tekniker *E-mail: p.onesti@democenter.it*
Avda. Otaola, 20 Apartado 44 *E-mail: jmartin@tekniker.es*
20600 Eibar, Gipuzkoa Spain *URL: http://www.tekniker.es/cowork/*

CrossFlow	**Cross-Organisational WorkFlow Management**	**Esprit Programme**

CrossFlow will investigate the problems associated with Cross-Organisational WorkFlow Management and develop the infrastructure necessary to facilitate the dynamic set-up of business relationships based on such workflows. The project aims to develop the following:

a detailed architecture which addresses the questions involved with cross-organisational workflow.

a framework for describing service contracts in specific application areas such as insurance related services and parcel delivery. This framework should enable the dynamic match-making of service contract offers and requests.

tools for setting up the link between the WfMSs of the two organisations. This will include tools for deriving components which are needed to ensure that the service contract is properly enacted. An example of such components are gateways which control and monitor the interactions, and translate the passing information from an internal to an external form and vice versa. Tools which can supervise the process of linking the two organisations and allocating the appropriate resources will also have to be provided.

extensions of the current facilities in WfMSs to provide non-functional guarantees specified in the service contract such as:

monitoring of out-sourced tasks: to provide information about out-sourced task progress, resources consumed and quality of service.

level of control of out-sourced tasks: to allow a client to abort or to roll back an out-sourced task and compensate for actions already taken where necessary.

change control of out-sourced tasks: to allow the modification of tasks after their dispatching.

where appropriate, the results of the project will be proposed as open standards to standardisation bodies and WfMS vendors such as SWAP, Workflow Management Coalition (WfMC), and OMG.

a publicly available demonstration of the deployment of the solution in a specific application area.

Project period: 22. September 1998 –

Contact:
CER IBM France - S3228 / BP43
06610 La Gaude
France

Jacques Saint-Blancat, Tel: (0)492 11 4719 //
Fax: (0)493 24 4545
E-mail: jsb@fr.ibm.com
URL: http://www.crossflow.org

Denema	Development of New Market for Telematics Products in Central Asia	Telematics Applications Programme

The DENEMA project is helping to connect Central Asia to the Information Highway by exploring new markets, raising awareness and transferring know-how for telematics applications. Long term strategies for co-operation with the European Union are being developed with direct collaboration between education, health care and business experts.

Activities include training workshops (Bishikek, May'98) specialising in distance education and SME Telematics (Tashkent, March'98) organised by the Kazakhstan Telecommunication Consortium (Katelco) with counterparts established in each country. A Central Asian Clearing House has been set up which will be used in conjunction with other projects (TeleInVivo) and the Central Asian telemedicine network (in co-operation with WHO) was launched. Hospitals are being equipped with more modern applications. UNESCO and HCCH are aiming to provide more specific information to health care professionals through digests which were previously found to be too general. Information is being obtained from specialised medical databases for which UNESCO is paying the access.

The Eurasia On-line '98 Conference, October 1998, was a joint conference between the countries of Central Asia and the European Union to increase cooperation in the area of new markets for telematics products and services for healthcare, education and training and electronic commerce. 80 memoranda were agreed as well as strategies for future collaboration. The conference has drawn European Union focus to Central Asia which is promised to be one of the priority regions under the 5th Framework programme of the EU.

Project period: November 1997 – June 1999

Contact:
UNESCO Information and Informatics Division
1, rue Miollis, bureau 14.44
75015, Paris
France

Dana Ziyasheva
Tel: 33 1 45 68 42 41
Fax: 33 1 45 68 55 83
E-mail: d.ziyasheva@unesco.org
Http://www.katelco.com/UNESCO/index.html
http://www.katelco.com/UNESCO/denema_en.html#focus
http://www.unesco.org/webworld/eurasia_98/index.html

DIPLOMAT	European Charter for Teleworking	ACTS Programme

DIPLOMAT comprises two main actions:

to create a comprehensive European Charter for Telework, identifying applications for ACTS and other technologies, and to obtain agreement on that charter.

to contact up to 2000 influential organisations in the process of discussions and of obtaining agreement, in order to solicit their views and inform them about teleworking, ACTS Technologies and the Information Society, stimulate telework trials and usage of ACTS technologies.

DIPLOMAT will use input from ACTS projects in general, and, more specific, from GAT Chain projects, in developing the guidelines.

Project period: 1997 - 1998

Contact DIPLOMAT:
University of Sustainable Resources
Gregor Mendelstrasse 33
A-1180 Vienna
Austria

Josef Hochgerner
Tel: +43 1 4950 44 214
Fax: +43 1 4950 44 240
E-mail: j.hochgerner@magnet.at
URL: http://www.telework-forum.org/diplomat.uk
New site: http://www.wise-forum.org

EcaTT	Electronic Commerce and Telework Trends	Esprit Programme

Benchmarking Progress on New Ways of Working and New Forms of Business across Europe

The EcaTT project is designed to generate representative information on the current prevalence and spread of electronic commerce and new forms of work among the European workforce together with an up-to-date compilation of major practices, projects and schemes across Europe. The aims of ECaTT are to:

make available representative, reliable and comparable data and information on the diffusion of new ways of working (telework) and electronic commerce, categorised according to main EU countries, sector, size of establishment, types of employees and types of household, etc;

develop an inventory of service provision and demand factors of electronic commerce on a representative, empirical basis, which can be updated regularly, so that current data relating to level of knowledge, practice, interest and potential of the different forms of electronic commerce and new ways of working can be made available;

carry out a representative analysis of current obstacles to electronic commerce and telework from the viewpoint of decision makers in business;

produce an analysis of the potential of electronic commerce and telework with projections of developments to the year 2005;

carry out a comparison between developments in Europe and in the USA which in many respects are looked upon as the leaders in the fields of electronic commerce and telework;

derive an understanding of conditions for the diffusion of electronic commerce and telework, which can be influenced by political or business action, while taking the differences between countries into consideration.

ECaTT was conceived as an "observatory project" which should be repeated annually in order to give reliable trend information together with a regularly updated market overview.

Overall EcaTT will provide a unique statistical basis on the penetration, potential and trends in new forms of working and business (electronic commerce). The information base will enable decision makers in government and the economy to benchmark achievements between different European regions and countries, with the future ability to reference a significant time period, and to make comparisons with the US and Japan, competing world economies.

Project period: 9/1998 - 4/2000

Contact:	*Werner Korte*
Empirica Gesellschaft für Kommunikations- und Technologieforschung mbH	*Tel.: 0228-98 530-0*
	Fax: 0228-98 530-12
Oxfordstraße 2	*Email: werner.korte@empirica.com*
53111 Bonn, Germany	*URL: http://www.empirica.com*

EETP	**European Educational Teleports**	**Telematics Applications Programme**

The project develops an delivers distance learning services to facilitate the continuous training of professional throughout Europe. Courses are delivered through web-based Virtual Campus and supported by video-based tuition.

Twenty European educational institutions and company-based training providers in Italy, Portugal, Spain, Ireland and Finland have come together to create the first common European-wide structure for continuing education services. These services are via special distance training centres or Teleports.

Contact:	*Graziano Di Paola*
TRAINET S.P.A	*E-mail: gdipaola@mbox.trainet.it*
	URL: http://eetp.trainet.it/

EMICO	**Editeur Multimedia Interactif et Coopératif**	**INCO**

A project developing and testing methods for localising training materials and courses from one language/culture/environment to another. The particular experimental context is localisation from France to the Middle East of a course relating to Quality standard ISO 9004.

Project period: 1 December 1997 – 1 December 2000:

Contact:	*Gérard Claës*
Société A6-Mediaguide	*Tel.: +33 1 60 77 72 06*
Research Department	*Fax: +33 1 60 79 49 87*
6 Rue Paul Claudel	*E-mail: 101467.633@compuserve.com*
F-91000 EVRY, France	*URL: http://www.cordis.lu/esprit/src/961977.htm*

EIES	**European Information Exchange Service for the communication between harbours**	**ACTS Programme**

EIES aims at defining, implementing and experimenting an advanced communication service to support routine and non-routine communication between harbour authorities, ship owners, customs, fire brigade etc. within harbour areas. To do so a demonstrator will be put into place and be used on a platform based on several technologies (Internet, ATM, ISDN, mobile technologies).

The project will provide input on guidelines on telecooperation and telework by exploring implementation of AC in-depth in a specific environment.

Project period: September 1995 – October 1998

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Contact: *Pierre PERROT & Marie-Christine TRAN*
Eutelis   *Tel : +33 1 55 33 36 07*
Blvd Poissonnière   *Fax : +33 1 55 33 36 47*
F-75009 PARIS   *E-mail: Pierre.perrot@eutelis.fr*
France   *http://www.expertel.fr/EIES*
                                                             http://www.isl.org/EIES

Epri Watch		ACTS Programme

EPRI-Watch has three major objectives:

to bring advanced communication technologies in the daily activities of a Parliamentarian to enable better understanding on the advantages of these technologies. Practical experience in communication technologies could have an implicit impact on political decisions made on related areas.

to create awareness and inform Parliamentarians on Information Society issues and research in advanced communication technologies and services

to stimulate an information exchange between political decision makers and the ACTS community.

EPRI-Watch has been going on since end 1995. It targets politicians interested in information society issues, provides them with information about European IS legislation and developments, and facilitates communication among them. The priority target group of EPRI-Watch were the Members of the European Parliament who might be more in need of communication technologies than other parliamentarians because of their three workplaces in Brussels, Strasbourg and in their constituency. When the service was launched, only a few Members of the European Parliament had email facilities. "EPRI-Watch has brought email to the European Parliament". Currently, the service has about 800 users.

EPRI-Watch has organised a large number of events. Last year, the participation of European politicians at the Telework '98 has been facilitated through EPRI-Watch. During that Conference an initiative for a meeting among national Parliamentarians in Europe about the use of ICTs in the work of Parliamentarians in order to better legislate, to better control the government and to better communicate with the citizens was launched. This event took place in the Assemblée Nationale in Paris on 25 and 26 March 1999

Project period: 1995-1999.

Contact: *Helga Treiber*
Teleport Sachsen-Anhalt   *Tel.: + 32 2 285 46 26*
Brussels Office   *Fax + 32 2 230 69 29*
EPRI-Watch Office   *E-mail: treiber@epri.org*
Boulevard Clovis 39, B-1000 Bruxelles   *URL: http://www.epri.org/*

EPSYLON	**E**nhanced **P**rocess modelling **SY**stem for **L**ean **O**perations maNagement	**Esprit Programme**

This project is aimed to define, implement and validate a new software for managing process information at the highest possible semantic level, thus allowing manufacturing firms to achieve the following benefits:

Improved management of process data formalising the whole knowledge of the shop floor

Control over complementary operations like recycling and resource maintenance

Improved planning and decision-making functions for both operative and strategic decision-making.

The EPSYLON project intends to produce a process modelling software supporting: (i) abstract operation types, to represent all kinds of shop-floor activities in a context-free and resource-independent fashion; (ii) aggregation of operations into processes; (iii) parameters and constraints to capture product-dependent and resource-dependent aspects; (iv) resource types definition in terms of structure, variable features, capabilities and independent behaviour; (v) partial or complete instantiation of process features in different product, resource and factory scenarios.

Furthermore, three decision support applications are developed: (i) for recycling processes originated from taken-back products, scraps and by-products, (ii) for maintenance, with the management of auxiliary operations; (iii) for simulation and strategic analysis. The integration with other software tools is pursued: (i) with respect to the STEP standard, (ii) with respect to existing schedulers (iii) and existing monitoring packages.

Project period: December 1997 – June 2000

Contact: *Dr. Ing. Sebastiano Sighinolfi*
Democenter s.c.a.r.l.   *Tel.: +39 59 848810*
Viale Virgilio 55   *Fax: +39 59 848630*
41100 Modena   *E-mail: s.sighinolfi@democenter.it*

Italy		*URL: http://193.207.81.209/democenter/*
ETD	**European Telework Development**	**ACTS Programme**

ETD has a wide remit covering telework, tele-trade and tele-cooperation,which includes direct support to the ACTS telework chain as well as comprehensive dissemination and awareness-building activities across Europe in order to:

stimulate early and effective take up of telework

develop common and concerted actions at both European and national level, using professional outreach methods to reach selected target audiences

remove barriers to take up by developing a clear vision and perspective of telework, and sharing this with the parties concerned

stimulate and support early and widespread use of the technologies of telework through a European network of telework websites and associated on-line services

Important mechanisms employed include:

the most comprehensive and frequently visited global web-site for telework, plus a network of related web-sites many of which are in local languages

support for European Telework Week each year in November, which in 1997 and 1998 experienced significant increases in activity and impact

comprehensive national and local initiatives and support through a network of 14 National Coordinators

Project period: June 1996 – September 1999.

Contact: *Jeremy Millard*
The Danish Technological Institute   *Tel.: +45 89 43 88 08*
Teknologiparken   *Fax: +45 89 43 88 43*
8000 Aarhus C   *E-mail: jeremy.millard@teknologisk.dk*
Denmark   *URL: http://www.eto.org.uk*

EVENT	**European Virtual Enterprise Network**	**ADAPT Initiative**

EVENT aims at advancing entrepreneurship, developing enterprise networks locally, nationally and globally utilising information technology and networking. EVENT has been registered as a trademark in Finland. It will provide a network concept and community after the project ends. Three servers for the project have been set up. The servers will provide a platform and several services for the participants under the commercialised domain http://event-net.fi. During project, several web-based training materials have been produced and training processes run such as: Internet tutorial, WWW-production, Internet strategy, Internet business and virtual consulting (coming soon). Several services and databases have been built up in co-operation with the EVENT participants. The EVENT databases provide information about the EVENT participants, their skills, services and their business. WUOKKO is service for co-operatives with database of 600 co-ops. Netshop provides the opportunity to start electronic commerce on the web. Virtual Gateway will be a service for EVENT participants providing advice for anybody in need of contacts, translation services, agent services, etc. in several countries. Virtual Mentor will provide consulting and mentoring services through networks. EVENT has induced several spin-off projects like 'Digital Content Production' and 'Content Production Incubator'. The VENICE project (Part of the Telematics Programme) is aimed at developing network environments for virtual enterprises. EVENT is co-operating with several regional network projects to disseminate, locally, concepts and services developed in EVENT.

Project period: February 1996 – December 1998

Contact: *Antti Auer*
University of Jyväskylä   *Tel.: +358 41 603626*
Continuing Education Centre, PB 35   *Fax: +358 41602521*
SF – 40351 Jyväskylä, Finland   *E-mail: auer@jyu.fi*

Gem		**Esprit Programme**

A project developing a knowledge base supporting creation and use of digital CVs that are portable across languages and cultural norms, and aiming to create a Network of Excellence for this work.

Contact: *Prof. Andrea Pontiggia*
Organization and Human Ressource Management Department   *Tel.: +39 02 5836 6323 / 6852*
   Fax: +39 02 5836 6883
Graduate School of Business Administration   *E-mail: andrea.pontiggia@sda.uni-bocconi.it*
Bocconi University, Milan, Italy

Gipseca	**A Generic Interactive Package for Systems Engineering**	**INCO-DC Programme**

	Courses and Applications	

The project is researching the organisation and development of educational multimedia material for use on Internet. Partners include several European and Mediterranean institutions. The focus is a teaching scheme for the integration of a number of engineering disciplines under the generic theme of Systems Engineering, and design and implemention of an interactive and networked multimedia package for use in academia and industry.

Contact: *Ali Zalzala*
Heriot-Watt University   *Tel.: 0044.131.451.3894*
Department of Computing & Electrical Engineering,   *Fax: 0044.131.451.3327*
Edinburgh, EH14 4AS,   *E-mail: a.zalzala@hw.ac.uk*
UK.   *URL http://www.cee.hw.ac.uk/~ali/gipseca*

Harmony	Coping with the Complexity of Business Innovation	Esprit Programme

HARMONY is a four year Intelligent Manufacturing Systems (IMS) project. The overall objective of the project is to develop an internet based support system for start-ups, innovation support institutions and investors that will help to increase the yield of innovation projects. The focus of this project is on start-ups operating in or servicing the manufacturing industry. Currently the project has 17 partners from Australia, EU, Switzerland and USA. In addition there are so-called "Circles of Experts" representing innovators, investors as well as support institutions.

Harmony evolved from the clearly identified need for an efficient and effective support for start-ups at both the company level, as well as at the level of the whole economy. Therefore, the vision shared by all partners is to set up internationally accepted practices for the support of start-ups based on multimedia and internet technologies. This integrated support, based on a holistic approach, is planned to be of high quality, easy to use, complete and internationally accepted.

<u>Project period:</u> 1998 – 2002

Contact: *Prof. Dr. H. Kühnle*
European co-ordinator: *Dipl.-Wirt.-Ing. B. Söndgerath*
Fraunhofer Institute for Factory Operation and Automation   *Tel: +49 (0)391 4090 -510 or -712*
Sandtorstr. 22   *Fax: +49 (0)391 4090 -596*
D - 39106 Magdeburg   *Email: soendgerath@iff.fhg.de*

IBCoBN	Integrated Broadband Communication and Broadcast Networks	ACTS Programme

The main objective of the project is to identify the broadband communication needs of residential users and key residential applications. It also aims to initiate longer term R&D into the IBC needs of the CATV sector and to create a centre of excellence to take over the identification of future requirements for local and regional cable networks. IBCoBN has run experiments in several CATV sites in Belgium, the Netherlands, Portugal, UK, Russia and Spain.

The universal IBC service planned by the project addresses the communication needs of residential users including older and disadvantaged people, as well as the needs of businesses (with emphasis on SMEs and freelancers/portfolio workers) and of the public sector (in particular care of older citizens). By verifying high speed applications which are desirable and affordable. The project expressed their interest to play a major role within the Telework Chain of ACTS, as telework is seen as a major application to support by residential broadband.

Contact: *John McEwan*
NSSL (ppr Integan CV)   *Tel: +44 1728 723410*
47A Fore Street, Framlingham   *Fax: +33 1728 621190*
Suffolk IP13 9DD, UK   *E-mail:* <u>100141.1356@compuserve.com</u>

ICARE 9000	On-Demand Consulting and Remote Electronic Training for SMEs in Urban and Rural Areas	Telematics Application Programme

ICARE 9000 is using advanced telematics tools like videoconferencing to provide technical support for companies seeking to achieve the ISO9000 certification by using tele-consulting techniques. Some of this consulting support is provided on-line, for example when an SME has a specific problem in applying the quality control manual, as this enables rapid expert advice to be offered. The project aims to improve the access of SMEs, particularly in less-favoured areas, to ISO9000 training courses, the follow-up of information and to offer telematics advice to quality engineers for whom regular travel to traditional courses is costly and time-consuming.

Contact:　　　　　　　　　　　　　　　　　　　*Dr. Birgit Heinz*
TELES AG　　　　　　　　　　　　　　　　　　　*Tel.: +49 30 399 28 241*
Doverstr. 2-4　　　　　　　　　　　　　　　　　*Fax: +49 30 399 28 242*
10587 Berlin　　　　　　　　　　　　　　　　　*E-mail: b.heinz@teles.de*
Germany　　　　　　　　　　　　　　　　　　　*URL: http://www.teles.de*

InfoBridge	**ACTS Programme**

The primary objectives of InfoBridge are to provide an information window through which the work of ACTS is visible to the outside world, as well as to publish accessible summaries of ACTS Projects and Domain results targeted at specific segments of the market (e.g. scientific, technical and policy communities). Furthermore InfoBridge will provide an electronic information base (Web-based Infospace) as a hub for the information exchange within ACTS and to the outside world.

InfoBridge will build on the work of the successful ACTS project InfoWin, addressing dissemination activities, which are not covered by InfoWin (e.g. extending the information window to new geographical regions especially Eastern Europe). It will continue the base information and service infrastructure after the end of InfoWin to ensure the visibility of ACTS results in the 5th framework programme.

InfoBridge will focus on the information generation from projects, information collation and consolidation around specific thematic points, information editing and condensation for specific audiences including the reporting of key events.

As InfoBridge will build on the work of the InfoWin project, it will use and extend the services, tools, products and experiences of this successful ACTS project to reach the objectives of InfoBridge. After the end of InfoWin in December 1998, InfoBridge will continue the tasks, which are necessary to ensure a successful dissemination of ACTS results focused on key events bridging the gap to the 5th framework. For all publications the well-known InfoWin label will be used to ensure continuity in the promotion of the ACTS Programme and its results.

Project period: from 1999

Contact:　　　　　　　　　　　　　　　　*Barbara Burr*
RUS – University of Stuttgart　　　　　*Tel.: +49 711 685 5811*
(Rechenzentrum Univ. Stuttgart),　　　*Fax: +49 711 678 7626*
Allmandring 30　　　　　　　　　　　　*E-mail: burr@rus.uni-stuttgart.de*
70550 Stuttgart, Germany　　　　　　　*URL: http://www.uk.infowin.org/ACTS/RUS/PROJECTS/ac359.htm*

Information, Communications and Technology Advisory Service	**LEADER Initiative**

Since it was set up in May 1994, the of the Western Isles, Skye & Lochalsh group has created about 100 teleworking jobs in the Hebrides, in North-West Scotland. One of the main points of this experimental phase was the constitution of a file of potential "teleworkers": a list of some 500 people, either residents or people wanting to move back to the islands, was drawn up and their skills noted. Since no local company existed in this sector, the LEADER group created a limited liability company, "Lasair Ltd", capable of managing contracts concluded with principals from anywhere in the world. Through the nature of the work, these teleworking posts constitute an activity with real added value, which goes far beyond simple data entry but involves skills in editing, re-writing, re-reading, computer graphics, etc. An experimental contract in 1996 with the Scottish Health Board further proved that purely "mechanical" data entry was non-profitable because it faced fierce competition from Third World countries. LEADER provided approximately 35,000 ECU for the supplementary training of the teleworkers.

The ICT Advisory Service has developed much further than the initial LEADER funded research Phase. We are now in the third phase with funding from ERDF (Objective 1) Total budget to Dec 2001 £360,000. A number of new ICT companies have now been attracted to this very rural area and our latest announcement is the opening of an ISP Net Centre in the town of Stornoway.The project has also been selected as a transferable project under theTerritorial Employment Pact Exchange Mart initiative.

Contact:　　　　　　　　　　　　　　　　　　　　　　　　　　　*Donnie Morrison, Manager*
Information, Communications and Technology Advisory Service　*Tel.: +44 1851 880 225*
Pairc House, Halbost, Lochs, HS2 9QB　　　　　　　　　　　　*Fax: +44 1851 880 386*
Isle of Lewis　　　　　　　　　　　　　　　　　　　　　　　　*E-mail: donnie@sol.co.uk*
Scotland, UK　　　　　　　　　　　　　　　　　　　　　　　　*URL: http://www.hebrides.com/itp*

InfoWin	**ACTS Information Window**	**ACTS Programme**

The main information and news point for the ACTS programme - Advanced Communications Technologies and Services. Produces online and printed information of many kinds.

Project period: 1996 to 1999

Contact: *Barbara Burr*
RUS – University of Stuttgart *E-mail: Burr@rus.uni-stuttgart.de*
(Rechenzentrum Univ. Stuttgart), *URL:http://www.uk.infowin.org/ACTS/*
Germany

Integrated programme for the development of teleworking centres	**ADAPT Initiative**

The project entitled aims at the encouragement of teleworking , this new "type of work" on regional level. More specifically the project aims at the encouragement of teleworking via the development of Teleworking Centres in remote areas of Greece. The targets of the project are as follow:

Exploration of a study concerning the framework (legal, financial etc) for the teleworking in Greece and in other countries of the E.U as well.

Collection and recording of employment opportunities of teleworkers in organisations and companies in the main cities of Greece (Athens , Thessaloniki, etc.)

Recording of qualifications and characteristics of the human working potential in the target regions in which the teleworking centres will be established.

Preparation of the support actions in the teleworking centres

Establishment and pilot operation of four teleworking centres in remote areas.

Creation and operation of the Association of Teleworking Centres.

Project period: December 1998 – December 1999.

Contact: *Bogonikolos*
Zeus S.A. *Tel: +30 61 622 655*
Trade Center A' Square - Riga Feraiou 93 *Fax: +30 61 272 425*
GR – 262 21 Patras, Greece *E-mail: zeus@zeusnet.gr*

LIQUIT	**Life Quality In Telework**	**Esprit Programme**

The overall aim of LiQuIT is to define and specify a methodology to support and monitor the resource management of teleworking teams with an exploitation strategy for its implementation in the EU business arena. The objective is to produce an enabling methodology, implementable as a set of operational tools, which will provide organisations with the resource management guidance appropriate to overcoming the teleworking inhibitors, which apply to them.

The approach of the project centres on the development of performance indicators, which can be measured to support the resource management of teleworking teams. The development of performance indicators will be based on detailed analysis, process design and tool specification which will be closely supported and verified by a representative user group. The user group will have a key role and will encompass representation from SMEs and large multi-national and Public Sector organisations.

The results of the project will be remodelled processes and identified performance indicators, together with a methodology for their application to a variety of organisation profiles and a specification for support tools that will facilitate their operational use. It is intended that these results will enable the future development of a set of tools, which will support the resource management of telework users, by enabling better management of remote resources and verification of the requirements of both business and tele-workers.

The development of an exploitation strategy will be a key part of the approach and a detailed market study will be undertaken in support this. Another key part of the approach will be the communication of the project's activities and a web site will be established to publish the project's experiences and results.

Project period: October 1998 – June1999.

Contact: *Stephen Swift*
C International Ltd., *Tel.: +44 1203 537043*
Haseley Business Centre, *Fax.: +44 1203 247220*
Warwick *e-mail: sswift@cinternational.co.uk*
CV35 7LS, UK

MARIFlow	**A Workflow Management System for Maritime Industry**	**Esprit Programme**

MARIFlow project aims to provide an architecture for automating and monitoring the flow of control and data over the Internet among different organisations, thereby creating a platform necessary to describe higher order processes involving several organisations and companies.

The higher order process is designed through a graphical user interface and mapped to the textual workflow definition language of the system called FlowDL. A process definition in FlowDL is executed through

cooperating agents that are automatically initialised at each site that the process executes. Agents handle the activities at their site, provide for coordination with other agents in the system by routingthe documents in electronic form according to the process description, keepingtrack ofprocess information, and providing for the security and authentication ofdocuments as well as comprehensive monitoring facilities.

The architecture is general enough to be applied to any business practice where data flow and invocation of activities among different industries and organisations follow a pattern that can be described through a process definition, however, the example applications are developed for maritime industry. The first prototype of the system is operational.

Project period: September 1999 – December 2000

Contact:	*Asuman Dogac*
Dept. of Computer Eng.	*Tel.: +90-312-210 5598 or 210 2076*
Middle East Technical University	*Fax: +90-312-210 1259*
06531 Ankara	*Email: Asuman@srdc.metu.edu.tr*
Turkey	*URL:http://www.srdc.metu.edu.tr/mariflow/*

MAST	Managers in Support of Teleworking	ADAPT Initiative

Aimed at SME managers, the project is producing training and methodological support packages to encourage and help Irish companies make more extensive use of teleworking. It is led by the Work Research Centre Ltd. (WRC), a research, consultancy and training organisation specialising in the impact of new technologies on working life and society in general, and health at work. Its first priority is to address three key issues – the lack of awareness about the realities of teleworking, the lack of knowledge about how to implement and manage it, and the lack of techniques for overcoming these difficulties. An appropriate package of tools and services is then being developed. The consortium includes Forbairt, the Irish national development agency, the National College of Ireland, Telecom Eireann, the Institute of Personnel Management and the Irish Institute of Training and Development. The transnational partnership involves German and Greek projects.

Project period: February 1998 – December 1999.

Contact:	*Dr Richard Wynne*
Work Research Centre Ltd.	*Tel.: +353.1/492-7042*
1 Greenlea Drive	*Fax: +353.1/492-7046*
Terenure	*E-mail: 100140,1053@compuserve.com*
Dublin 6W, Ireland	*E-mail: mt.fanning@wrc-research.ie*

Mellisa	Methods and tools for natural language interfacing to standard software applications	ESPRIT Programme

The project is developing technology and providing tools which will enable end users to interface, using natural-language, to computer applications systems, and to apply this technology successfully to obtain a pre-competitive product validated in selected end-user applications.

Contact:	*E-mail: jfrias@sag.es*
Jose Frias	*URL:*
Software AG Espana,	*http://dbs.cordis.lu/cordis-cgi/srchidadb?ACTION=D&SESSION=237891999-5-*
Spain	*13&DOC=1&TBL=EN_PROJ&RCN=EP_P*

MIRTI	Models of Industrial Relations in Telework Innovation	Telematics Application Programme

MIRTI (in the Telematics Engineering sector) is providing models of industrial relations in telework innovation by examining different definitions and types of telework through a series of case studies, developing suitable tools (legal framework and contractual arrangements), and scenarios. Its objectives include providing:

Guidelines for companies and public administrations when they introduce telework

Guidelines for contacts between employers and employees

Wide recommendations and guidelines at national and EU levels.

The web-site provides translation in five languages (English, French, German, Italian and Spanish) and the CD-ROM including the MIRTI Handbook "Implementing Telework" (5 languages) includes a hypertext comparison of 30 European agreements on telework across a number of issues, including working time, technology, privacy, status, health and safety, etc. The CD-ROM was made available in September 1998. To receive it, please contact info@mirti-on-line.org.

Project period: April 1996 – July 1998

Contact: *Renato Rizzo*
MIRTI Consortium   *Tel.: +39 049 8084760*
c/o Telerete Nordest   *Fax: +39 049 8084734*
Corso Stai Uniti 14/b   *E-mail: r.rizzo@iol.it*
35127 Padova, Italy   *URL: http://www.telework-mirti.org.*

MtoM3d	Made-to-measure garments 2D/3D approach	INCO-DC Programme

MtoM3D is an international research project with the objective to increase the market and the value of the apparel products made in Developing Countries. This will be reached by enhancing the offer to the plus-size sector, which is considerable in Europe and North America.

The aim of the project is to offer a new method for fitted garment production especially for plus size people. The project will develop a system dedicated to evaluating measurements from a standard reference and to computing corresponding alteration sets for garments directly from a set of physical mannequins defining different anatomical conformations (see Annex II), according to, and controlled by our state of knowledge. Elements will be integrated in order to evaluate alterations to apply to the 2D patterns of the standard size garment, mounted and displayed on a plus size mannequin. The vertical balance of the garment influenced by the mannequin volume will be studied on a set of mannequins defining different anatomical conformations. Fabric mechanical properties will be utilized in order to simulate fabric behaviour, especially the draping effects caused by the mannequin volume and the constraints due to the assembly of the garment pieces. A criterion describing vertical balance will be investigated and used for the computation of these alterations.

In conclusion the proposed method consists of:

the use of the 3D model of a plus size mannequin to produce a first alteration of the 2D patterns, coming from a standard size ones,

the 3D synthetic mounting of the garment on the 3D plus size mannequin,

the computation of the criterion of vertical balance from the 3D shape of the computed garment,

the computation of new alterations corresponding to the optimisation of this criterion.

Project period: November 1997 – December 1999

Contact: *André Gagalowicz*
INRIA, Domaine de Voluceau, B.P. 105   *E-mail: Andre.Gagalowicz@inria.fr*
F-78153 Le Chesnay Cedex   *URL:*
                                                        http://www.ercim.org/MtoM3D/index.html

MULTIMEDIATOR	Multimedia Publishing Brokerage Service	ACTS Programme

The project has demonstrated the use of an intelligent multimedia brokerage service for pan-European customers and suppliers in the publishing area. Services offered include specialised video-on-demand, hypervideo, and conventional publishing services. Existing technology and project developments have been integrated for this purpose. Amongst the key issues are a whiteboard for multimedia document production and communication APIs for several communication protocols.

The trial has explored the added value of the services to be developed to telework/telecooperation.

Project period: September 1995 - February 1998.

Contact: *Jaime Delgado*
Logic Control, S.A.   *Tel: +34 93 401 68 14*
Ctra. De Prats 122   *Fax: +34 93 728 54 04*
E-08208 Sabadell (Barcelona)   *E-mail: delgado@ac.upc.es*
Spain   *URL: http://www.ac.upc.es/multimediator*

NET-TELEMED European network on tele-medicine	ADAPT Initiative

The project will implement a tele-medicine structure and a Clinical Information System (CIS) within a private hospital and it will begin a continuing training system for the personnel (technical, medical and nursing) to guarantee the quality of the service offered to patients.

Using the system, a strong co-operation will be developed, between the hospital and other modern medical centres throughout Italy, and Europe (test-bed for on-line consultation). The project will establish an innovative system of tele-medicine for patient assistance through a computer-based system and qualified personnel. The training action plan for is one of the major aspects of the project, and will provide all of the personnel in charge of hospital services with the necessary technological know-how and practices. The project will also attempt to accelerate the development of new tasks and activities, such as tele-doctors

Project period: March 1998 – April 2000..

Contact:	*Clinica Moto*
Casa di Cura Noto – Pasqualino	*Tel.: +39 91 6841753*
Via Dante, 330	*Fax: +39 91 6822449*
I – 90100 Palermo, Italy	*E-mail: telemed@siade.com*

NOTE	**A project developing virtual office facilities**	**ESPRIT Programme**

Project developing and testing technologies supporting virtual office applications for mobile workers.

Contact:	*Dr. Rigobert Foka*
Thomson-CSF Communications,	*E-mail:rigobert.foka@tcc.thomson-csf.com*
France	*URL: http://www.telecom.ntua.gr/note/*

	NUEVAS TRABAJADORAS	**EMPLOYMENT Initiative NOW**

The regional authorities of Andalucía are investigating new sources of employment in the new technologies sector. An important partner for the regional authorities is EUROCEI, the Business Innovation Centre (BIC) that can draw on a large experience in working in the SME sector. The BIC provides a wide range of services responding to the needs of SMEs and it is developing strategic plans for economic revival of local areas at risk. Through its expertise in the SME sector the BIC is very well placed to help analyse the needs and requirements of enterprises related to teleworking.

The objectives of the project are:

To define level of knowledge and sensibility on teleworking among Andalusian companies and Andalusian women;

To define new employment profiles using teleworking;

To define company profiles with a high potentiality to hire teleworkers

To foster the introduction of these new employment profiles as an innovative mean to impulse new opportunities for women in the job market,

To analyse own and other people's experiences in teleworking in order to detect actual an potential problems that will help in reaching an adequate telework practice.

The main tasks and activities are the following:

To carry out both socio-economic surveys, first focused in employers and the other one focused in female employees and women looking for a job;

To celebrate a meeting about the legal aspects of teleworking;

To train twenty-four women in order to acquire new technical, personal and social skills directed to teleworking;

To carry out eight pilot experiences in teleworking, with the participation of eight women and eight companies contacted by EUROCEI;

To elaborate a "Good Practices Manual in Teleworking".

Project period: June 1998 – November 1999

Contact:	*Enrique Piriz Salgado*
Eurocei – Centro de Empresas e Innovación S.A.	*Tel.: +34 5 41 705 17*
Autovia Sevilla-Coria del Rio, KM 3.5	*Fax: +34 5 41 711 17*
E – 41920 San Juan de Aznalfara, Sevilla, Spain	*E-mail: ceia@eurocei.com*

O.U.E.A.	**Observatoire Urban du Axe Atlantique**	**Article 10 of the ERDF**

The *Observatoire Urban du Axe Atlantique* (OUEA) is a non-profit foundation bound to create a common ground for all citizens, professionals, business firms and institutions in the Galicia-North Portugal Euro-region. The OUEA tries, on one hand, to favour the advent of a learned society; on the other, it tries to propiciate the mutual understanding and to reinforce the economic and social relations in the area.

Objectives:

To create a virtual space in order to have better communication and understanding

To identify, organize and develop existing information resources in the area

To cooperate towards increased knowledge about our society and its potential

To contribute to the creation of employment associated to new information technologies

To facilitate structured information to those responsible for political and business planning

To foster the advent of a learned society

To assist social cohesion between 2 regions

Expected impact / Main policy goals:

Make available an on-line database of dynamic socio-economic information system

Promote teleworking with the aim of creating new jobs

Facilitate strategic decisions that will have an impact on cohesion

Minimize the negative effects of the socioeconomic isolation of peripheral regions

Project period: March 1997 – September 1999.

Contact:	*Sonia Trigo*
Consorcio Zona Franca de Vigo	*Tel: +34-986-205565 / 213265*
Area Portuaria de Bouzas, Of 14-D	*Fax: +34-986-205565*
36208 Vigo	*E-mail: ouea@zonafrancavigo.com*
Spain	

PERFECT		**ESPRIT Programme**

The PERFECT project aims to contribute to changing the way of working in the European Process Manufacturing Industries by moving away from the restrictive conventional practice of single variable monitoring (univariate), to process performance monitoring based on multivariate statistical techniques.

Contact:	*Jim Anderson*
Newcastle University	*E-mail: jim.anderson@ncl.ac.uk*

RapidPDM	**Rapid Implementation of Product Data Management**	**ESPRIT Programme**

The primary objective of the RapidPDM project is to develop a generic PDMimplementation methodology that is supported with a set of IT-tools. Thiswill address the needs of industry by supporting the implementationprocessfor product data management. The objectives of this project are to:

- Develop methods to structure, manage and speed up the productdevelopmentprocess;

- Develop tools to support the implementation process, also in SMEs;

- Make the methodology available to manufacturing industry throughworkbooks, courses and educational material;

- Make the tools available to PDM-vendors and consultants so that they canbe presented to the market.

The ultimate goal of the project is to reduce the cost, time, risk andeffort of product data management implementation, and to make the benefits available to European enterprises, particularly SMEs. These methods andtools are innovative because they are not available at present and becauseexisting methods for implementing e.g. ERP-systems do not work for PDMsystems.

Project period: 1 September 1998 – 1 February 2001

Contact:	*Dick Mandemaker*
M.I.S. Organisatie-Ingenieurs,	*Tel.: +31.346.570888*
Planetenbaan 69,	*ax: +31.346.552388*
P.O.Box 1773,	*E-mail dick.mandemaker@mis.nl*
NL - 3600 BT Maarssen, The Netherlands	*URL:www.rapidpdm.org*

Safety-NET	**Leading Competence Development Globally**	**Telematics Applications Programme**

Safety-NET is a project which demonstrates the potential of emerging multimedia information and communication (ICT) technologies to assure the performance of employees engaged in safety-critical work in the railway, maritime, port and offshore exploration industries. The project is part-funded by the European Commission's Telematics RTD Programme.

For the most part prior to Safety-NET, training provision in our partner sectors (Rail, Offshore Exploration, Ports and Maritime operations) was traditional in nature - provided in classroom formats either on-site or in a training centre, by an internal or external training agency. Training events were prescriptive, of fixed duration, timed to fit in with shift-based working patterns, and orientated towards group learning activities. Pre-programmed, high cost training services of this type preclude many individuals from accessing learning opportunities and present logistical and financial barriers for organisations wishing to invest in the development of their employees.

Safety-NET directly confronts these problems and demonstrates the value that new ICT technologies can add through providing:

Safety-critical employees (learners), in remote locations, with access to competence development (training and assessment) resources and services in the workplace;

Traditional learning service providers with guidance, methodologies and resources to deliver competence development services to the workplace;

Managers in organisations with competence standards, methodologies and tools for conducting performance assessments in the workplace

the results of which can support company-wide work authorisation systems;

designers and producers of multimedia flexible and distance learning/assessment materials with experience and best practice guidance on the design of such materials for users in safety-critical contexts.

The project has produced a range of Competence Development Modules and a Flexible Learning Site using Internet and Intranet technologies to produce a learning system that revolutionises the way training and development is delivered in our partner organisations.

Project period: January 1996 – June 1998.

Contact: *Mike Newton MSc*
MARINTEK   *Tel: +47 7359 5990*
P.O. Box 4125   *Fax: +47 7359 5778*
Valentinlyst   *E-mail: Mike.Newton@marintek.sintef.no*
N-7002 TRONDHEIM, Norway   *URL: http://www.marintek.sintef.no/snet/*

SICMA	Scalable Interactive Continuous Media Server - Design and Application	ACTS Programme

SICMA aims to design a scaleable server for the delivery of images, data and continuous multimedia information. It will also demonstrate its efficiency by applying it in a "Virtual Museum". The server will be used within various test-beds serving a large number of users under various conditions. An extension of the project- SICMA-EAST - provides a scaleable HTTP server for delivery of highest resolution still images, together with metadata information. In a Pan-European trial the chain: data server in Moscow – satellite link to a mirror server in Germany – Internet connection to a museums network in Europe will be implemented and demonstrated. Link to Telework/Tele-cooperation: The design of scaleable interactive media servers will have a strong impact on the cost of on-line services, and will, therefore, contribute to the place independence of work.

Project period: Sep. 1995 – Jan. 1999

Contact: *Uwe Knaak*
Parsytec Computer GmbH   *Tel: +49 241 9696-456*
Auf der Hüls 183   *Fax: +49 241 9696-500*
D-52068 Aachen, Germany   *E-mail: kna@parsytec.de*

SMARTS	SME and Regional Telecoms Support	ACTS Programme

The strategic objective of SMARTS is to increase the participation of small and medium sized enterprises (SMEs) in the work of and exploitation of results from the ACTS programme. In this project 'participation' is defined as:

full partnership or subcontractor in a new or established ACTS project

triggered use of broadband technologies and services in their own proprietary technology base

attendance at ACTS events

use of broadband products and services by non-technically based SMEs (e.g. in tourism)

engineers and scientists from SMEs joining ACTS projects and trials as guest researchers.

The project achieved these strategic goals by adopting three strategies aimed at mitigating the barriers of remoteness, poor infrastructure, and the inability to fund the overhead of direct partnership in ACTS projects by:

Organising a "participation broker" based on Advanced Communications Technologies and Services driven by the needs of SMEs; and, offering services via a European network of regional Points of Presence (PoPs) that provide services to more then 5300 SMEs;

Performing a News and Information Service on topics and items related to ACTS and advanced communications that are of particular interest to SMEs seeking to participate in ACTS;

Actively promoting the participation of SMEs in the work of ACTS by means of a campaign that increases the awareness among SMEs of the opportunities offered in advanced communications, by brokering consortia with SME participation, and by offering on-line SME support services to ease their burden and the overhead costs of participation. The SMARTS multilingual translation tool for instance offers through five European language pairs an additional advantage to the daily business of the SMEs.

SMARTS will contribute particularly in the areas of tele-cooperation and teletrade, whereas the overlap with the electronic commerce environment can be substantial

Project period: January 1996 – March 1999.

Contact: *Comelia Muhl*
Teleport Sachsen-Anhalt GmbH   *Tel: +49 39203 82030*
Steinfeldstrasse 3   *Fax: +49 39203 82031*
D-39179 Magdeburg-Barleben, Germany   *E-mail: smarts@tsa.de*

SME and Micro-Business Adaptation via European Superhighway Technology	**ADAPT Initiative**

The project will introduce teleworking and tele-training into SMEs in traditional rural areas where multimedia and telecommunication technologies are slow to be accepted. The Trentino Alto-Adige Region is marked by small, scattered communities. The project addresses the needs of commuters, of women workers who can combine their home and parental care duties with a job, and of those who have difficulty reaching a workplace. It has three objectives: enabling workers to adapt to industrial change by improving their qualifications and mobility; creating new jobs through the European Superhighways; and providing executive counselling.

Project period: October 1996 – November 1998

Contact: *Astrid Caleffi*
Dator S.R.L.   *Tel.: +39 474 555455*
Via S. Lorenzo, 2   *Fax: +39 474 555051*
I - 39031 Brunico (Bolzano), Italy   *E-mail: cal@dator.it*

STACISS	**Support for Telematics Applications Co-operation with the Commonwealth of Independent States**	**Telematics Applications Programme**

The STACCIS project aims to strengthen co-operation in telematics applications in the areas of education, scientific and technological research and environmental decision-making between the European countries of the Commonwealth of Independent States (CIS) and their counterparts in the European Union.

With the growing need to implement more effective computer networking and telematics- based applications as economic stability improves in the region, the European CIS countries also represent a major prospective market for telematics applications and offer a great deal of potential for professional and scientific co-operation in this area. Closer co-operation with the European Union is providing support through increased available information on market opportunities and an increased number of service providers.

Through a process of demonstration and presentation of telematics applications, over 1700 users in the CIS countries are being directly introduced to the key results of the Telematics Applications Programme.

Another 2500 educators, researchers and managers in these countries are being trained in the use of telematics services and networks. STACCIS is assisting the seven European CIS countries (Armenia, Azerbaijan, Belarus, Georgia, Moldova, Russia and Ukraine) in establishing national telematics applications information services and user training programmes and providing a foundation to formulate a strategy for East-West co-operation in the development, exchange and use of telematics applications.

Project period: July 1996 – June 1999.

Contact: *Ms Dana Ziyasheva*
Information and Informatics Division   *Tel: 00 33 1 45 68 42 41*
UNESCO   *Fax: 00 33 1 45 68 55 83*
1, rue de Miollis, 75732, Paris Cedex 15   *E-mail: d.ziyasheva@UNESCO.org*

STEPS2	**Strategic Topics in Engineering of Public Services for Employment**	**ESPRIT Programme**

The project is working with public administrations in Italy and Spain (Catalonia) to re-engineer activities relating to Structural Funds (Italy) and Employment Services (Catalonia).

The main objectives of the project are:

to improve access to the labour market, i.e. providing the means to address youth employment, combat long-term unemployment and labour market exclusion, improve the establishment of equal opportunities;

to promote the vital role of the Public Employment Service in the adoption of a more proactive role in job placement;

to increase the capability of Central and Regional Administrations to utilise European Structural Funds, so that a larger amount of financial resources may be invested in the fight against unemployment;

to implement new organisational models ensuring:

time and cost efficiency in administration management

transparency and information to users

equal opportunity and impartiality

enhancement of the attitude towards citizens and undertakings.

The main project results will be in the areas of Organisational System, Human Resources, Information System, Services to Citizens and Undertakings

Contact: *Alberto Savoldelli*

MIP,   *Tel: +39 02 2369181*
2, Via Fucini   *Fax: +39 02 23691820*
20133 Milan   *E-mail: alberto.savoldelli@polimi.it*
Italy   *URL: http://www.steps2.aat.it*

STEPWISE		ESPRIT Programme

The objective of STEPWISE is to improve the quality and reduce the cost of software generated from EXPRESS information models.

Information modelling (also known as data modelling) is an important technique to help rapid development of software applications. It is especially useful for data exchange. The ISO standard EXPRESS (ISO 10303-11) is a powerful information-modelling language which underpins the STEP (Standard for the Exchange of Product data) standard.

The use of EXPRESS is becoming more widespread, both within and outsidethe STEP community, and there is increasingly a desire to be able to generate better implementation code directly from models. However, this is not always easy. If the model is at a sufficiently high level to be useful as a design tool then it is likely to be at too high a level for direct implementation. Conversely, if the model has been developed with implementation in mind, then it is likely to be cluttered with a lot of data that obscures the real structure of the information it represents.

STEPWISE is addressing this issue by developing a methodology and software infrastructure to allow intelligent transformation of EXPRESS models. The technique is being used to develop improved procedural interfaces (PI), relational database tables and file formats, including XML.

Project period: November 1997 – February 2000

Contact: *Tel: +44 1684 592 144*
Robin La Fontaine   *Fax: +44 1684 594 504*
Monsell EDM Ltd,   *E-mail: robin@monsell.co.uk*
United Kingdom   *URL: http://www.stepwise.org*

STORM	Stochastic Non-Stationary Modeling Environment for Decision Processes in Financial Markets	ESPRIT Programme

The project's objective was to develop a software environment called STORM designed for the specific requirements of empirical modelling in the financial markets sector. The STORM environment is to combine state-of-the-art technical analysis and econometric techniques with new Emerging Software Technologies (EST) within a comprehensive software environment. STORM will enable financial analysts to perform intelligent data analysis, predictive modelling, and multi-objective optimisation to build decision support systems in applications such as asset allocation, stock picking or trading systems, in a stochastic/deterministic, linear/non-linear, stationary/non-stationary investment environment.

The ESTs to be used in the STORM environment have been selected from new research undertaking from the field of neural networks design, adaptive system, fuzzy logic and evolutionary search techniques. They are especially suited to be applied in a stochastic, non-linear and non-stationary investment environment.

From a research (technology) point of view, the main objective of STORM is to enable the co-operation of different technologies to design, operate, and revise a given decision process in market finance.

From a business (financial application domain) point-of-view, the main objective of STORM is to make the technologies implemented usable as robust and packaged components. This should allow rapid prototyping of applications based on these components, as well as the design of real-life applications, even for users or consultants who are not familiar with the technology used.

Contact: *Patrick Naim*
Elseware,   *Tel: +33 1 44 58 93 40*
26-28 rue Danielle Casanova,   *Fax: +33 1 42 96 68 68*
75002 PARIS   *E-mail: patnaim@elseware.fr*
France   *URL: http://www.elseware.fr/referenc.htm#Stochastic*

SUSTAINS	Support Unable Users to Access Information and Services	ESPRIT Programme

The project aims at developing and demonstrating a new software technology able to support service organisations, typically Public Administrations, in improving their relationships with users who have difficulty in using conventional IST technology interfaces.

_____

Contact:	E-mail: m.ferraro@finsiel.it
Fabio Russo	URL: http://dbs.cordis.lu/cordis-cgi/srchidadb?ACTION=D&SESSION=99671999-5-13&DOC=1&TBL=EN_PROJ&RCN=EP_PG
Finsiel S.p.A	
Italy	

T4D	**Telework Platform**	**Telematics Applications Programme**

The project's objective is to further validate and demonstrate the usability and viability of applying an existing virtual employment agency for teleworkers (TEMPLE) to improve the job opportunities for a selected group of mobility handicapped people (paraplegics) from rural areas of Europe.

The project offers a unique combination of strengths in a synergetic and holistic approach to align its technical, commercial and social objectives. In effect, the project is largely the result of a formal request from the disabled community, represented by some of the largest hospitals and surrounding supporting institutions for paraplegics in Europe, to TEMPLE to try what they perceive as the apparently most effective and cost-efficient telematic application to improve the job opportunities of their disabled people as part of an overall recovery and social re-insertion process.

The fact that T4D has emerged as a concrete application of an already validated experience (TEMPLE), brings to the project the following contributions:

an already existing virtual employment agency for teleworkers experienced in analysing the main trends of the labour market, in terms of new job profiles, skills and competencies.

a telematic platform supporting integrated applications from on-line training and technical advice for teleworkers to Webcasting.

Specifically, T4D will carry out the following tasks:

identify, select, train and give support to the disabled teleworkers participating in the project.

provide the telecentres (validation sites) with the required equipment.

adjust and customise the existing telematic platform, in order to meet the specific requirements of the disabled teleworkers.

carry out a marketing campaign aimed at promoting the social and tax related advantages of hiring disabled teleworkers.

validate, demonstrate and evaluate the pilot trial.

develop a Guideline of Good Practices.

| *Contact: Sonia Fernandez* | *E-mail: soniaectf@tst.es* |
| *FUE-ECTF* | *URL: http://www.t4d.net/en/topz.htm* |

TEAMNET	**Tele Employment Access Methodology through NEw Technology**	**LEONARDO DA VINCI Programme**

The aims of the T.E.A.M.NE.T. project are to:

invite the different social entities to consider the working capabilities of disabled people, through a Social Dialogue with Disabled Associations, trade unions, business associations, public entities of the 9 Member States of the 12 institutions involved in the transnational partnership;

develop a tele-employment system to promote the placement of disabled people into the labour market using telework.

The multilingual system, available on Internet at the following address: http://euro.asphi.it/town, allows the disabled person to insert his/her data, their CV as well as the telework task he/she wishes to perform; the employer can request a teleworker for a specific job in the same manner. The system automatically guaranteed to perform the research and, if the match offer/demand occurred, a message will be sent to the company and the teleworker, so that the contact can proceed

Project period: December 1996 – December 1998.

Contact:	*Mr. Luigi Rossi*
ASPHI ONLUS	*Tel.: +39 051 277803*
Via Arenti 6-8	*Fax: +39 051 224 116*
40124 Bologna	*E-mail: lrossi@asphi.nettuno.it*
Italy	*URL: http://euro.asphi.it/town*

TEBELA	**TElematics Bridge between Europe & Latin America**	**INCO-DC Programme**

The TEBELA project is designed as an accompanying measure to the technical research projects in INCO-DC concerned with furthering the Information Society. TEBELA aims to support research activities by encouraging the development of networks and links between Europe and Latin America in connection with teleworking

(including electronic commerce, innovative applications of Information and Communications Technology (ICT), sustainable development and the Information Society generally). These networks will support researchers and teleworkers, providing a common forum involving government, employers and individuals. The concept of sustainable development underscores the aims of the project and provides its rationale.

TEBELA objectives are designed with the key aim in mind: the early detection of technological, organisational, legal and social trends that may affect future developments of teleworking initiatives on both sides of the Atlantic.

Contact: *E-mail: protocol@ectf.org.uk*
Andrew Page   *E-mail: protocol@tebela.org*
Protocol Communications Ltd   *URL: http://www.tebela.org/*

TECODIS	**Teleworking in Co-operative Development of Industrial Software**	**ACTS Programme**

Teleworking is now viewed as one possible means of achieving a more flexible allocation of skilled people to time critical projects than is currently possible within a centralised office environment. In this context the project has two main objectives: Firstly, to demonstrate the use of teleworking in the software development industrial area in the most realistic possible way. Secondly, to demonstrate the viability of teleworking by developing a teleworking support platform and demonstrating its practical use in a large scale international engineering project. Link to Telework/Tele-cooperation:

TECODIS will be able to contribute to the future deployment of telework, as well as to the development of guidelines, considerably. The project's contributions to be expected are the development of a Teleworking Model, a Cost/Benefit evaluation based on real users, development of a teleworking platform and in the area of dissemination and linkage to other programmes.

Contact: *Julio Lopes*
Ericsson S.A. - Centro I+D   *Tel: +34 1 339 2883*
Retama 1   *Fax: +31 1 339 2804*
28045 Madrid, Spain   *E-mail: emejlr@madrid.ericsson.se*

TELEMART	**Telematics Marketing of Teleworkers**	**Telematics Application Programme**

TELEMART's objective is to develop teleworking services and systems to the benefit of new and existing teleworkers, telework brokers and telework clients alike. The project is concerned with attempting to create better conditions in the labour market for workers looking for a job using telework tools and techniques through networking activities such as brokerage services. Marketing of teleworkers and finding the business are the keys to this, as historically the problem has always been finding the work.

The key players or actors in TELEMART are TeleMart Service Operators (TSOs), customers, brokers and "suppliers" (i.e. the teleworkers). The TSOs are the commercial vehicle for providing services to brokers and suppliers, including standards and accreditation, facilities management, marketing and training, and together represent TeleMart International, which is responsible only for maintaining standards.

The EC sponsored phase of the project finished in December 1998, and the members are now exploiting the results. Service operation is due to commence in UK and Sweden in 1999, other countries following on.

<u>Project period:</u> January 1996 – December 1998

Contact: *David Horne*
Tradezone International Ltd.,   *Tel.: +44 1642 216 200*
Zetland Buildings, Exchange Square   *Fax: +44 1642 216 201*
Middlesborough TS1 1DE, UK   *E-mail: david.horne@tradezone.co.uk*
                                                                 URL: http://telemart.org

TELESHOPPE	**Tele-shopping services using virtual reality and interactive multimedia**	**ACTS Programme**

The main objectives of TELESHOPPE are to investigate how the usability of the user interface with advanced multimedia technologies and virtual reality can be enhanced by simulating the "touch and feel" of physical shopping in a tele-presence shopping experience. Usability will be measured in a series of usability trials of tele-shopping services using broadband ISDN and IBC networks. The objectives seek to characterise the effect that network bandwidth (to the end user client device) will have on usability of the tele-shopping service.

The key issues involve multi-disciplinary collaboration ranging from software engineering, virtual reality, interactive coded video, speech technology, spoken dialogues, video production and programming. The prime interest of the project is usability engineering of the user interface for IBC shopping applications. This will

obviously provide input to the products of the telework chain.

Project period: October 1995 –August 1999

Contact: *Jean-Paul Lefèvre*
ARCHESl   *Tel: +33 608 98 73 72*
7 Allée de la Veissière   *Fax: +33 476 99 89 83*
F-38640 Claix   *E-mail: JPLefevre@compuserve.com*
France   *Web-site:http://www.cocom.dk/teleshop.htm*

TELE TOOLS		ADAPT Initiative

The aim of the project is to develop tools which facilitate telework in SMEs. These tools will not only cover the IT aspect, but will also include aspects related to individual development and work organisation, as well as legal and insurance issues. The project will use the Web to give access to introductory material about telework, on-line learning sessions, references to consultants, other experience (local, national and international). Learning material in book-form and on CD-ROM will be developed. A group of instructors, able to teach and work as consultants, will be available as mentors/animators.

The transnational aim of Teletools is to develop an understanding of teleworking , to identify best practices in serving the needs of the teleworking society and to exchange know-how about necessary framework for teleworking. The development work will include appropriate training strategies and methods as well as learning material that facilitates the design of flexible organisations. The transnational partners are from Germany, Austria, Ireland and Denmark.

Project period: 1997 - 1999

Handelhojskolen i Århus   *Anders Petersen*
Haslegaardsvej 10   *Tel.: +45 89 48 66 88*
DK - 8210 Århus V   *Fax: +45 86 15 76 29*
Denmark   *E-mail: Anders.Petersen@org.hha.dk*
                                                                       URL: http://www.org.hha.dk/telework/teletools

TELEWINT	TELEWork INTerregional	INTERREG II

The objective of TELEWINT is to strengthen the competition-position of SME's in the Benelux Central Area by the application of Telework. It is a pilot project in which "border-crossing" telework knowledge and experience will be obtained by the realisation of 64 teleworking places in 16 participating SMEs.

The participating SMEs come from different branches like civilengineering, ICT, tourism, accountants, wholesale, banking, insurance, brokers etc. The knowledge and experience gained during the pilot projectwill be disseminated to all SMEs in the region.

TELEWINT is supported the INTERREG II Programme. In June 1999 the TELEWINT project has been nominated as a finalist in The Global Bangemann Challenge for its contribution to advance the development of the Information Society locally and globally.

Project period: October 1998 – April 2001

Contact: *Mr. P.H.Boegborn RI*
N.V. REWIN West-Brabant   *Tel.: +31 76 56 46 788/789*
Mozartlaan 7   *Fax.: +31 76 56 46 788/789*
P.O.Box 3182, 4800 DD Breda, Netherlands   *E-mail: 101522.11202@compuserve.com*

TEN-TREND	Telework Remote Enterprise Network Development	Trans European Telecoms Networks

The overall objective of the project is to investigate the feasibility of applications of telecommuncations services to support a full range of telework and other new ways of working. The principal objectives are to:

investigate user needs in respect of applications supporting telework

define organisational requirements for supporting teleworking employees and their implications for TEN-TREND applications

draw up a framework covering user, application, management, organisational and legal aspects of telework

define a full set and a core set of applications for support of telework

investigate the feasibility of the set of applications defined in the TEN-TREND framework

validate pilot implementations of selected applications

monitor the viability of proposed applications as evidence of feasibility, acceptability and usefulness, and generate and maintain up-to-date business plans

assess viability and commit appropriate levels of resource to complete the investment plan for the project

Project period: January 1997 – June 1998

Contact: *Simon Robinson*
Empirica   *Tel.: +49 228 98530-0*
Gesellschaft für Kommunikations- und Technologieforschung GmbH *Fax: +49 228 98530-12*
Oxfordstrasse 2, 53111 Bonn, Germany   *E-mail: simon.robinson@empirica.com*

TEX.AT.WORK	Textile Application of Teleworking	Telematics Application Programme

TEX.A.WORK Textile applications of teleworking has been promoted by 15 partners in four countries: Italy, France, Spain and Finland. The main aim of the project is to demonstrate that through the implementation of telematics applications in inter-company processes the competitiveness of the SMEs belonging to the Textile/Clothing/Distribution (TCD) and transport value chain and therefore the efficiency of the whole industry chain can be maintained and improved through:

reducing the time required to react to market demands and increasing the level of quality of the service offered to the customers;

accelerating the flows of materials, both eliminating non - productive waiting times and making transport organisation more efficient;

synchronising the operations made by the different subjects involved in the TCD chain;

taking into consideration the decentralisation trend of the production cycle.

The whole project life cycle has been based on a bottom-up approach: for the definition and realisation of the results, the users requirements have been carefully considered on a continuous basis, being them an integral part of the scheme. The iteration between the defined user needs and general considerations on the value chain has been frequently realised, in order to use specific considerations for general purposes and to maintain the desired level of action. Using such an approach, both the technologies to be used and the functional features of the applications, closely connected to the main business relationships within the value chain, have been identified.

The objectives have been achieved through the implementation, technical validation and economic and organisational assessment of telematics applications integrated into existing informative systems in SMEs of the TCD chain and transport sector

Project period: 01.01.1996 – 31.03.1999+.

Paola Perini   *Tel.: +39 51 236 242*
ASTER   *Fax: +39 51 227 803*
Via Morgagni 4   *E-mail: texatwork@aster.it*
40122 Bologna, Italy   *paola.perini@aster.it*
                                                            URL: http://www.aster.it/texatwork

TEX.COM.TOOLS	Co-operation for the Development of Technical Tools for the improvement of Industrial Communication in Textile / Clothing sector	INCO-DC Programme

The TEXCOMTOOLS project comprises research activities focused on the development of technical tools which will enable the fast and accurate exchange of technical information in subcontracting procedure. The project aims to improve industrial communication in the textile and clothing sector between European Union and Mediterranean Basin countries. It is focused on the need for standardised technical information in clothing chains, and seeks to facilitate exchange of this information, contributing to the generation of EDI voluntary standards for the exchange of clothing products technical data, including the provision of efficient technical tools.

The main steps for the realisation of the objectives of the project, are the identification and specification of user requirements, the development and formulation of standard technical specification sheets, the exchange of technical specifications in an electronic form and the dissemination of the results achieved.

The project builds upon the developed infrastructure, know-how, results and reputation gained through activities of all its members-partners: that is three Textile Technological Centres: CLOTEFI, Greece- CETIH, France- CETTEX, Tunisia, EDIGRAC, an organisation activating in EDI and 4 industrial companies: TRIUMPH International- Greece, Maroc Modis & Kandy- Morocco and Delsa, Tunisia. All the critical phases / elements during the implementation of the project is monitored on a regular basis, to guarantee continuous control, to identify common problems and to improve and adapt the selected methodology.

Project period: October 1997 – September 2000

Contact:
CLOTEFI SA
Clothing, Textile & Fibre Technical Development S.A.
4, El. Venizelou Str
GR-17676 Kallithea, Athens
GREECE

Fani Kotzia
Tel: 301-9234932, 9237355
Fax: 301-9235603
E-mail: fkotzia@etakei.gr
Nena Malliou, nmalliou@etakei.gr
E-mail: clotefi@etakei.gr

TOBASCO	Towards Broadband Access Systems for CATV Optical networks	ACTS Programme

The aim of TOBASCO is to upgrade existing CATV networks with high splitting counts, with broadband interactive services by applying High-Density Wavelength Division Multiplexing in a cost effective way, and to demonstrate the viability of the system in a field trial. Thus the project will advance the introduction of interactive services in existing CATV networks.

Interactive services on CATV networks will allow mass participation in applications as telework and telelearning. The project will contribute to the promotion of those applications

Contact:
Forward Looking Work
Bell Laboratories, Lucent Technologies
P.O. Box 18
1270 AA Huizen, The Netherlands

Ton Koonen
Tel:+31 35 6874558
Fax:+31 35 6875954
E-mail:koonen@lucent.com
URL:http://www.ctit.cs.utwente.nl/Docs/research/projects/tobasco

TOOLIT	LEADER Initiative

The Toolit project brings together three partners involved in teleworking projects in rural areas of Northern Sweden, the Western Isles of Scotland and the Highlands of Luxembourg. The scope is to create a value added service with the collaborative input of each partner's skill resources, like languages and marketing. The first partnership meeting was fully supported by LEADER funding (local budgets plus a 5,000 ECU transnational cooperation grant from the LEADER European Observatory).

Skoglandet LEADER II AB
Box 100
S-94222 Älvsbyn
Sweden

Kristina Öhman
Tel.: +46 929 128 50
Fax: +46 929 128 30
E-mail: kristina@skogslandet.se

TOPILOT	Multimedia service for distance learning	Telematics Applications Programme

The TOPILOT project was co-financed by the European Commission. Its objective was to improve the education of occupational travellers (i.e. circus, fairground and bargee communities) by the introduction of new technologies. This was to be achieved by creating a distance learning system, based on wireless communications.

The TOPILOT communication platform consisted of a CD-I player, and a GSM-modem as learner workstation, a PC with Internet connection as tutor workstation, and a central server to enable communication between tutor and learner.

3 multimedia packages were created to test the system:

Basic Skills: for pre-school children

Electricity: vocational training to learn about basic Electricity skills

Business skills: vocational training for circus and fairground families to run their businesses.

The communication platform and the learning packages were validated during a period of 5 months. The evaluation report was very positive. The parents reported that their children's motivation and progress improved 'because somebody monitored their work'. Another important outcome of the project is that it raised awareness about the potential of new learning technologies in the field of occupational travellers.

Three exploitation routes have been identified: publication of the learning packages as such, continuation of the distance education service and co-operation with commercial publishers to add communication options to their existing products. EFECOT plans to found a distance education centre to manage this.

Project period: January1996 – January 1999

Contact:
EFECOT
Grensstraat 6
B-1210 Belgium

Mr Kasper Peters
Tel.: 32/(0)2 227 40 66
Fax: 32/(0)2 227 40 69
E-mail: kasper.peters@efecot.net

http: //www.efecot.net

TOSCA		ESPRIT Programme

TOSCA is a research project, funded by the European Commission within the ESPRIT framework "Integration in Manufacturing" (IiM). TOSCA aims at a task oriented flexible user interface with speech input which offers one single human machine interface (HMI) for interacting with all components of a manufacturing system.

The TOSCA HMI will increase productivity through concurring processes as well as ergonomics by offering a natural way of communication.

The main results of the proposed project will be:

a data structure for task oriented logging of input and distributing it to the participating manufacturing units,

a speech recognition system for adverse conditions as in shop floor environments,

the implementation of the data structure and the integration of the speech system into the numerical control (NC) systems, and

a demonstrator of the task oriented MMI for control of a CNC-lathe with a handling system.

Contact: *Claes Nordström*
SMT Machine AB,   *Tel.: +46-21-805120*
PO Box 800,   *Fax: + 46-21-805111*
S-721 22 Västerås,   *E-mail:claes.nordstrom@SMT-Machine.se*
Sweden   *URL: http://www.wzl.rwth-achen.de/WM/PROJEKTE/TOSCA/*

TWEURO	Telework Europa	Telematics Application Programme

TWEURO is a TAP support action providing mediated services and fora on both Compuserve and the Internet for TAP projects, and acts as the unofficial web-sites for the TURA (Telematics for Urban and Rural Areas) and the IADS (Integrated Applications for Digital Sites) sections where information about projects, their deliverables, plus other relevant issues relating to TURA and IADS can be accessed. TWEURO has developed push mechanisms for its dissemination activities, including web-casting TAP and other events, thereby making real time audio and video signals available to ordinary narrow-band internet users. TWEURO also provides an unofficial but nevertheless useful way by which TURA projects (or prospective TURA projects) can telework with each other and with the Commission.

Project period: January 1996 to December 1999

Contact: *Jeremy Millard*
The Danish Technological Institute   *Tel.: +45 89 43 88 08*
Teknologiparken   *Fax: +45 89 43 88 43*
8000 Aarhus C   *E-mail: jeremy.millard@teknologisk.dk*
Denmark   *URL: http://www.tweuro.com*

USINACTS	Usability in ACTS	ACTS Programme

The function of USINACTS is to identify, characterise, document and disseminate examples of successful application of usability principles from ACTS usage trials, and from industry. The objective is to show that the application of usability principles delivers tangible benefits, through promoting services better adapted and configured to the requirements of the users.

Accurate and thorough user needs analysis is a critical requirement for developing and operating applications and services suitable for teleworking and telecooperation.

Tutorial material on Usability Evaluation has been produced by the project.

Project period: June 1996 – February 2000

Contact: *Ann Clarke*
Loughborough University   *Tel.: +44 467 355 002*
Human Science & Advanced Technology Research Institute   *Fax: +44 1509 23 46 51*
The Elms, Elms Grove Loughborough, LE11 1RG   *E-mail: annemclarke@compuserve.com*
Leicestershire, UK   *URL: http://atwww.hhi.de/usinacts.html*

Virtual Workplace	ADAPT Initiative

The Virtual Workplace project intends to help SMEs to benefit from information networks in their business. The use of ICT leads to changes in ways of working, which can be realised as telework using

ICT. A number of telework training programmes has been created and run in the project: virtual entrepreneur, tele-consultant, media on the web, utilisation of information networks. They have been delivered using Amiedu Net College over the Internet being in this way also practice in the use of the tools for telework. Both virtual and physical telework support services have been set up to facilitate a continuing training process.

European Telework Support Centre (ETSC) has been created in cooperation with the transnational partners. A 'telework driving license' verifying mastery of telework tools and practices has been developed. It is available in our Amishop, Amiedu´s Net shop (www.amidedu.net). Creating networks of SMEs offers them new business opportunities.

Project period: January 1996 – December 1999

Contact:	*Hannele Ikonen*
Amiedu, Professional Training Center	*Tel.: +358 0 54031*
former Ammatti-Instituutti	*Fax: + 58 0 5403292*
Valimotic 8, P. O. Box 151	*E-Mail: hannele.ikonen@ami.fi*
SF - 00381 Helsinki, Finland	*URL: http://www.amiedu.net/eng/virtual1.htm*

VKN Virtuelles KMU Network-Management		**ADAPT Initiative**

The basis of this project is the transfer of competencies for the management of virtual companies as a precondition for the development of virtual SME networks. New modular training packages will be developed, in order to train future teletrainers on interface management, process organisation, new ways of providing information, corporate culture and the intercultural dimension. Simulation games, and software, such as Virtual Company and LOTUS Notes, constitute the appropriate training tools. Furthermore, it is planned to link people with future-oriented business plans in order to allow them to co-operate as virtual companies, connecting them to the target group of teletrainers. This networking will be supported technically by the promoter. Starting in the region Südbaden, this project will eventually spread throughout Germany.

Contact:	*Herr Dr. Jan H. Peschka*
IPC - International Project Center AG	*Tel.: +49 761 38620: Fax: +49 761 386211*
PF 5801	*E-mail: peschka@ipc-ag.com*
D - 79026 Freiburg	*URL: http://www.ipc-ag.com*

Annex 3: Online information on telework and related topics

A3.1 European Telework *Online* (ETO)

The **European Telework *Online*** web site at http://www.eto.org.uk is now well established as the world's premier web-site devoted to telework and related topics. With a growing number of contributors from around the world, an extensive set of resources and links to related sites in many languages and countries, its popularity has increased significantly during the last year. Monthly requests have doubled to over 190,000, equating to over 20,000 user sessions from over 85 countries. Significant enhancements to site content were made during 1998-9 with many pages, especially country specific pages, being added or updated and with the addition of new features including a query driven resources database, an easy to use web-based discussion forum, and copies of presentations.

Site Overview

European Telework *Online* aims to provide employers, policy makers, teleworkers and other interested audiences with access to useful and timely information and help. An overview site schematic is shown in Figure A3.1. It has four main themes:

Telework - working virtually over electronic networks, not just from home but in a wide range of location independent modes

Teletrade - electronic commerce in its broadest sense

Telecooperation - working cooperatively across organisational and geographic boundaries, either in formal arrangements or informal networks, virtually over electronic networks

Information Society - new methods of work (to reflect actions in the 5th Framework Programme)

These themes provide users with information through different types of page and access mechanisms:

Introductory pages - basic information including definitions, opportunities and strategies

Frequently Asked Questions - on topics ranging from getting work to disabilities

Links - links to other web sites

Resources database - details of resources

Events calendar - of telework and Information Society events around the world

Online discussion forums - via a user-friendly web interface (WebBoard)

European Telework Development (ETD) - information about the ETD project

Search and navigation - search engine, contents page and details of recent changes

Feedback - general feedback, posting information and registration of interest.

As well as Web pages, the site also holds information in other formats - e.g. Word documents and Powerpoint presentations. The site thus provides an extensive resource as well as encouraging dialogue and sharing of knowledge and experiences by the teleworking and online community.

Key Developments in 1998-9

Several of the features introduced in 1997-8 have been enhanced and updated:

Country Pages - many pages have significantly more local content, and there is also more local language content. New countries added include Norway, Latvia, Moldova, Ukraine and Canada.

Events Database - this remains a useful source of a wide range of events - both local and international.

ETD News - published quarterly in conjunction with the ETHOS Newsletter, the online edition has meant access to more readers, and often ahead of the hard-copy publication.

Strong links have been maintained with European Telework Week, which now has its own web-site http://www.eto.org

Figure A3.1 Overview Schematic of European Telework *Online* web site.

European Telework *Online* - Web Site Schematic

ETO

http://www.eto.org.uk

Web Site

Telework /twork/	Teletrade /ttrade/	Telecooperation /tc/	Information Society

Introductory

Opportunities,benefits, strategies
FAQs: /faq/faqintro.htm

Electronic commerce, opportunities, strategies, enabling technologies

Benefits, strategies democractic process CSCW etc.

IST Programme
New Methods of Work
/ist-nmw/

Information & Links
resource.htm

European Telework Week
http://www.etw.org

FAQs & links:
resource.htm#ttradefaqs
/links/ttrade.htm

FAQs & Links:
resource.htm#tcoopopps
/links/tcoop.htm

Statistics (by country)
Telecomms
- connections, charges
- computers/ISDN
- Internet
- economy etc.
(60 in total)
/eustats/

Country Pages

National Pages
/nat/ for full list
/nat/xx/ (xx=country code)

Note
Some URLs are given relative to top page.
Thus /nat/ is http://www.eto.org.uk/nat/

Interaction

Telework WebBoard (online forum) http://webboard.www.eto.org.uk/~telework
Various email discussion lists e.g. economic development, telecooperation best practice, disabilities /discuss/discuss.htm
ETO feedback (email: eto-info@eto.org.uk) o Registration of Interest /forms/regform1.htm

In Depth

Resources Database - over 1,500 resources   /resource/index.htm
Presentations e.g. *New Ways of Working*, *Being Effective Online* /etd/etd-pres.htm
About ETD - project info, participants etc /etd/ o ETD News (quarterly) /etd/news/

Site Navigation

Contents	Search	Recent Updates
contents.htm	AT-etoquery.htm	getfiles.htm

ETO Site Guide (July 1999)

European Telework

Enhanced Statistics - the site now includes over 60 relevant indicators for most EU countries. The main categories are telecommunications penetration, computers and ISDN, the Internet, access and call charges, education, economics, employment.

The main additions and enhancements to the site during the year were:
A Resources Database - this provides an overview of over 1,500 resources and offers several ways of searching.
Presentations - 16 Powerpoint presentations given by ETD participants at various events; users can view slide by slide or download a Powerpoint presentation file.
IST - New Methods of Work - pages to encourage participation and project formation for the corresponding 5th Framework Programme action line.
Web-based Discussion Forum - users see a structured topic tree, so can view and contribute to topics that specifically interest them.
 More information on these is provided below.

National Pages
There are now 27 countries and two regions with their own teleworking pages on ETO, 17 of which have local language translation of one or more key pages. Most pages hold the following basic information:
Summary of telework status in country
Contact details of ETD coordination
National Telework Enquiry point details (if different)
Links to national and/or local language online information resources
Details of any local or national Telework Association
Registration of Interest.
See section A3.2(B) below which includes ETO's country pages.

Resources Database
This represented the largest single effort by the ETO project team during the year. It involved both creation of the database mechanisms and initial population of the database. The database runs on a separate server from the Web pages, while administrator and user interfaces allow it to be manipulated from the web. For example, users can submit new entries or comments (reviews), which are validated before uploading into the main database. Users query the database by using web-based forms and the results are generated and displayed on pages generated 'on-the-fly'. As at July 1999, there were 1,585 resources in the following topic categories (note - a single resource can belong to more than one category):
Telework, telecommuting (906)
Teletrade, electronic commerce (483)
Telecooperation, cooperative networking (480)
Information management, knowledge management (287)
Education, training (189)
Democratic process (67)
Community networking (229)
Users can select by topic, type of resource, by specific resource fields e.g. author, title, or free text. Over 20 resource types are represented. As well as conventional hard-copy resources (books, articles, periodicals), there are many online resources - discussion lists, forum archives, electronic presentations, webcasts and the ability to add radio and TV programmes. Around 80 per cent of the resources are online and therefore easily accessible over the Internet. The resources database is at: http://www.eto.org.uk/resource/index.htm

Presentations
Presentations from and about the ETD Initiative can be viewed directly on the web or downloaded in Powerpoint 97 format. Representative titles include:

New Ways of Working in the Public Sector and Public Services (June 1999)
Being Effective Online (June 1999)
Image and Enterprise: Local Prosperity in a Global Networked Economy
Online Communities: Opportunities and Challenges

Europe's Progress Towards an Information Society
Developing the Market for the Technologies of Telework
The full list, with regular updates, will be found at: http://www.eto.org.uk/etd/etd-pres.htm

IST - New Methods of Work
With the inauguration of the 5th Framework Programme, the ETO site is being used as an example of telecooperation to help project teams form to bid for projects in the action line 'New Methods of Work'. This section of the site is designed to stimulate bridging activities between the 4th and 5th Framework Programme in the relevant topic areas. As well as basic information and pointers to the relevant EU pages, there are links to projects of the 4th Programme that are clustered according to the themes of the 5th. There are also opportunities to enter discussion forums and make contact with potential participants and project partners. The IST pages at the ETO site are at: http://www.eto.org.uk/ist-nmw/index.htm

Web Based Discussion Forum
Since its inception, ETO has run forums through email discussion lists. At the time (1996), it was felt that online forums, such as those enjoyed by users of CompuServe or employees on corporate networks with access to groupware such as Lotus Notes, were not universally available or affordable to Internet users or easy to use. During the last year or so, there have been several new or enhanced products that made it possible to offer such a service. Thus, O'Reilly's WebBoard was implemented at the ETO site as a user-friendly alternative to an email list.

The general telework forum has thus been implemented as the Telework WebBoard. It provides an interface that shows threaded message, so that users can see the structure of the discussion. Just as in modern file managers on operating systems, users can expand or contract portions of the forum tree. The figure below shows the overall look and structure of the general discussion forum. The WebBoard has proved popular, there being over 1,000 registered users. One disadvantage is that activities (at the moment) need to be carried out online. Therefore, in those locations where telecommunications or Internet costs make this too expensive, the email list is still available. Its archives can also be accessed directly on the web. The Telework WebBoard can be found at: http://webboard.eto.org.uk

Site Statistics
During May 1999 the European Telework *Online* web site received 192,294 hits at an average of 6,203 hits a day, from users in at least 86 countries, who downloaded more than a Gigabyte (1,000 Megabytes) of information. The top ten requested pages (other than the home page) are shown in the table below. Seven of the top 10 are the same as last year. The new entries are the *Telework 98 Status Report*, the statistics, and the search engine, indicating how invaluable such a tool is on a site with so many resources.

Acknowledgements
A site of the magnitude of ETO would not be as successful as it is without the help of many people. Although ETD gets support from the European Commission, most of the web content, particularly that of the heavily visited national pages depends extensively on unpaid volunteers. The core site development team acknowledges their extensive contribution to the success of this site. Particular recognition over the past period is due to the technical help from the ETO Internet Service Provider Loud-n-Clear.com and to the database team that did the initial entries to the resources database - Roumen Nikolov, Evgeni Galabov and their colleagues at Virtech Ltd. of Sofia, Bulgaria. We are pleased to acknowledge their contribution and those of the many other contributors to the world's premier teleworking site.

Introductory Screen from Telework WebBoard
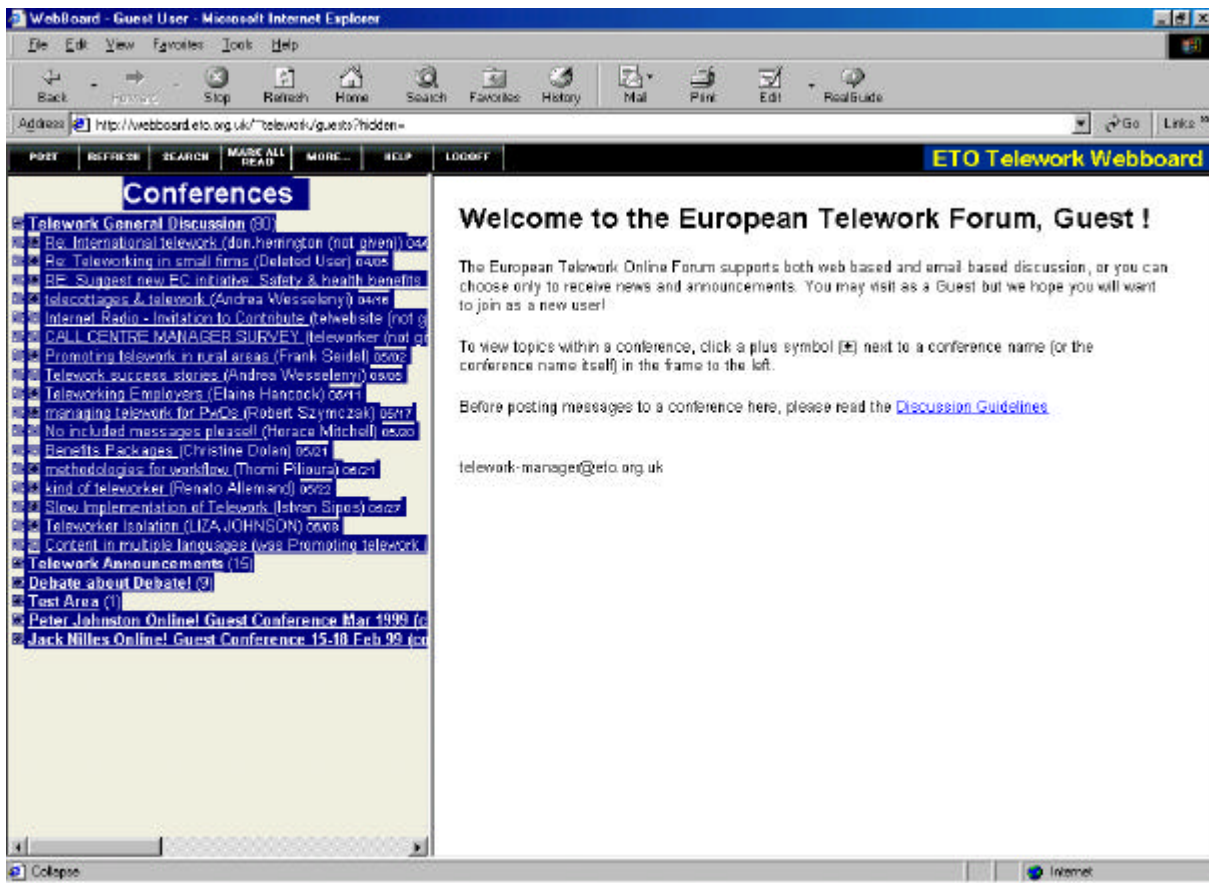
1	**Country Specific Telework Pages** *http://www.eto.org.uk/nat/index.htm*
2	**ETO Resources** *http://www.eto.org.uk/resource.htm*
3	**European Telework Main Page** *http://www.eto.org.uk/twork/*
4	**European Events Calendar Service** *http://www.eto.org.uk/events/*
5	**European Telework Development Initiative (ETD)** *http://www.eto.org.uk/etd/*
6	**FAQ: Telework (Telecommuting): The Benefits** *http://www.eto.org.uk/FAQ/faq03.htm*
7	**Telework 98 (European Commission Status Report)** *http://www.eto.org.uk/twork/tw98/*
8	**FAQ: How Can I Get Work As A Teleworker** *http://www.eto.org.uk/faq/faq04.htm*
9	**Information Technology Statistics** *http://www.eto.org.uk/eustats/*
10	**Search The European Telework Online Site** *http://www.eto.org.uk/AT-etoquery.htm*

Table A3.1 - European Telework Online Web Site: Overview of Contents

Telework	**Information Society (General)**
Previous European Telework Weeks:	Economics of - OECD Workshop
ETW98 , ETW97 , ETW96 , ETW95	EC Fifth Framework Programme
ACTS Telework Chain (GAT)	Opportunities and Threats
Benefits and Opportunities	**Internet/Intranet**
Telework Charter (DIPLOMAT)	Access (Universal)
Code of Practice	Growth
Definitions	Intranets
Disabilities and Telework	Regulatory
Employment - Getting Work	**ETD (European Telework Development)**
European Telework Agenda	Goals
European Events Calendar	Interest Groups (discussion lists)
Homeworking	Who Can Benefit
Resources and Links	Participation - how to get involved
Strategies - Employers	- Join The ETO Site Team
Strategies - Teleworkers	Presentations (Powerpoint)
Telecottages vs. Telecentres	Press Releases
Tools For Teleworkers	The ETD Team
Traffic Congestion	- The People Behind The Web Site
European Commission Status Report: *Telework 1998*	**ETD Team Profiles**
European Commission Status Report: *Telework 1997*	Maarten Botterman – DGXII ACTS
- WWW Pages or Zipped File	Michel Ickx - National Activities Coordinator
Actions For Stimulation Of Transborder Telework And	Jeremy Millard - Project Manager
Research Cooperation In Europe: *Telework 1996*	Horace Mitchell – Programme Director
- Zipped File	Ian Simmins – Webmaster
Teletrade	David Skyrme – Information and Communications Manager
Benefits and Opportunities	**Audience Interests**
Challenges	Employers (and ETD)
Definition and Overview	Employers and Managers (telework)
EDI	Researchers
Electronic Commerce (EC)- contrasted	IT and Individual Teleworkers
EC - SME Memorandum of Understanding	IT and Telecommunications Managers
Enabling Mechanisms	Media
- Payment Mechanisms	Policy Makers
- Secure Transactions	Suppliers (IT, Telecoms etc.)
G7 Conference on Electronic Commerce	Technology Developers
Resources - see also Documents	Trade Unions
Strategies	**Countries**
Telecooperation	Austria
Definition	Belgium
How does telecooperation work?	Bulgaria - In Bulgarian
Who can benefit from telecooperation?	Canada
ETD - an example of telecooperation	Central and Eastern Europe
Telecooperation and the Democratic Process	Czech Republic - In Czech
Reading about telecooperation and related subjects	Denmark - In Danish
Some PowerPoint presentations on telecooperation	Finland
What Are Groupware and CSCW?	France - In French
Links related to telecooperation and CSCW	Germany - In German
Information and Resources	Greece - In Greek
Discussion Lists - general	Hungary - In Hungarian
- ETD Interest Groups	Ireland
- LEADERNET - Rural Employment	Italy - In Italian
ETHOS-ETD Newsletter	Latvia - In Latvian
ETO Web Site Accolades	Luxembourg
European Events Calendar	Mediterranean Countries
Infomation Technology/Society Statistics	Moldova
Links to other TTT sites	Netherlands
- Telework	Norway
- Teletrade and Electronic Commerce	Poland - In Polish
- Telecooperation	Portugal - In Portuguese
- Information Society	Russia - In Russian
Information Society Webring	Spain - In Spanish
Media Backgrounders	Sweden - In Swedish
Presentations From ETD (Powerpoint)	Switzerland - In German
Press Releases (ETD)	U.K.
Recent Additions And Updates	Ukraine

Note – The above is an extract from the contents page at http://www.eto.org.uk/contents.htm

Please consult this web page for current update and active links to these subjects.

A3.2 European telework sites

Telework Association Sites

Austria	Österreichische Telearbeitsvereinigung (ÖTA), Austrian Telework Association	http://www.oeta.at
Belgium	The Belgian Teleworking Association (BTA) – French and Dutch	http://www.bta.be
Finland	Finnish Flexiwork Forum	http://www.tkk.utu.fi/oustotyo
France	Association Française du Télétravail et des Téléactivités (A.F.T.T.)	http://www.aftt.net
Germany	Verband Telearbeit Deutschland (VTD)	http://www.vtd.org
Ireland	Telework Ireland	http://www.telework.ie
Italy	Telelavoro Web Italia	http://www.mclink.it/telelavoro/
	Societa'Italiana Telelavoro (SIT)	http://www.societaitalianatelelavoro.it
Luxembourg	Association Luxembourgeoise des Télé-Activités (ALTA)	http://www.alta.lu
Netherlands	Netherlands TelewerkForum (Stichting Nederlands Telewerk Forum)	http://www.telewerkforum.nl
Portugal	Associacao Portuguesa para o Desenvolvimento do Teletrabalho	http://www.teleman.pt/apdt
	Associacao Portuguesa de Teletrabalho	http://www.teletrabalho.com
Spain	Asociación Española de Teletrabajo	http://www.cibertica.es/aet/
Sweden	Swedish Networker Association	http://www.enter-by.net
UK	The Telework Telecottage and Telecentre Association (TCA)	http://www.tca.org.uk/
	Scottish Teleworking Association (STA)	http://www.cali.co.uk/sta/
	Telefythynnad Cymru (Telecottages Wales)	http://www.telecottages.org/

Other European Country Specific or Local Language Sites

Austria	European Telework *Online* Austria Austrian Telework Website (German)	http://www.eto.org.uk/nat/at/ http://www.telearbeit.at/
Belgium	European Telework *Online* Belgium	http://www.eto.org.uk/nat/be/
Bulgaria	European Telework *Online* Bulgaria	http://www.eto.org.uk/nat/bg/

Central and Eastern Europe	European Telework *Online* Central and Eastern Europe	http://www.eto.org.uk/nat/eec/
Czech Republic	European Telework *Online* Czech Republic	http://www.eto.org.uk/nat/ckz/
Denmark	European Telework *Online* Denmark Telearbejde i Danmark Distancearbejde (Danish Retail and Office Workers Union, HK)	http://www.eto.org.uk/nat/dk/ http://www.ttt.dk/ http://www.distancearbejde.dk
Finland	European Telework *Online* Finland National Telework Theme Group	http://www.eto.org.uk/nat/fi http://www.uta.fi/telework/
France	European Telework *Online* France Télétravail - information française	http://www.eto.org.uk/nat/fr/ http://www.eto.org.uk/nat/fr/
Germany	European Telework *Online* Germany European Telework Deutschland TA Telearbeit Telearbeit im Mittelstand OnForTe (best practice in Telework) Secure Teleworking in Communal Administrations Internet Telework Job Exchange Teleworking Germany: job offers	http://www.eto.org.uk/nat/de/ http://www.eto.org.uk/nat/de/indexde.htm http://www.ta-telearbeit.de http://www.iid.de/telearbeit/mittelstand/ http://www.onforte.de http://www.bmwi.de/projekte/telearbeit/datel.html http://www.telejobservice.de http://www.go-teleworking.de
Greece	European Telework *Online* Germany Greek Teleworking (in Greek and English)	http://www.eto.org.uk/nat/gr/ http://www.teleworking.gr/index_en.htm
Hungary	European Telework *Online* Hungary	http://www.eto.org.uk/nat/hu/
Ireland	European Telework *Online* Ireland Communication Workers Union site with telework support services Teleworking jobs online	http://www.eto.org.uk/nat/ie/ http://www.cwu.ie http://www.jobfinder.ie
Italy	European Telework *Online* Italy European Telework *Online* Italia Telework and Disability	http://www.eto.org.uk/nat/it/ http://www.eto.org.uk/nat/it/itindex.htm http://www.ailun.nuoro.it/telework
Latvia	European Telework *Online* Latvia	http://www.eto.org.uk/nat/lv/
Luxembourg	European Telework *Online* Luxembourg	http://www.eto.org.uk/nat/lu/
Mediterranean countries	European Telework *Online* Mediterranean Countries (MED)	http://www.eto.org.uk/nat/med/
Moldova	European Telework *Online* Moldova	http://www.eto.org.uk/nat/md/
The Netherlands	European Telework *Online* Netherlands	http://www.eto.org.uk/nat/nl/

Norway	Project Telework	http://www.avenir.no/fjernarbeid/index.htm
Poland	European Telework *Online* Poland	http://www.etc.alpha.net.pl/eto/
Portugal	European Telework *Online* Portugal	http://www.automail.pt/telework/
Romania	European Telework *Online* Romania Sfetcu Home Page with general information on teleworking	http://www.eto.org.uk/nat/ro/ http://www.geocities.com/eureka/park/3622
Russia	European Telework *Online* Russia In Russian	http://www.eto.org.uk/nat/ru/ http://ieie.nsc.ru/~eto/
Spain	European Telework *Online* Spain Teletrabajo en España Forum Español de Teletrabajo	http://www.eto.org.uk/nat/es/ http://www.eto.org.uk/nat/es/indexesp.htm http://www.festel.org/
Sweden	European Telework *Online* Sweden Distansforum	http://www.eto.org.uk/nat/se/ http://www.distansforum.se
Switzerland	European Telework Switzerland In German Telework Unlimited	http://www.eto.org.uk/nat/ch/ http://www.eto.org.uk/nat/ch/chdeindx.htm http://www.telework.ch
UK	European Telework *Online* UK UK Teleworkers Web Site	http://www.eto.org.uk/nat/uk/ http://members.aol.com/telwebsite/
Ukraine	ETO Ukraine	http://webber.net.ua/astro/eto

General Telework Sites

Andrew Bibby – telework notes	http://www.eclipse.co.uk/pens/bibby/telework.html
British Telecom – telework reports	http://www.labs.bt.com/innovate/telework/index.htm
Connected - Alan McClusky: views/links	http://www.connected.org/
ECTF – European Community Telework/Telematics Forum	http://www.telework-forum.org
ISPO (Information Society Programme Office) - EC background paper on telework - page of telework links	http://www.ispo.cec.be/infosoc/telework.html http://www.ispo.cec.be/g7/backg/telework.html http://www.ispo.cec.be/infosoc/telework.html
MIRTI project	http://www.telework-mirti.org
Poptel - trade unions and telework	http://www.poptel.org.uk
Research Institute (FIM) – Linz	http://www.fim.uni-linz.ac.at/telework/telework.htm
TW Europa (Telematics Applications Programme)	http://www.tweuro.com
W.I.S.E. forum (Work , Information Society and	

Employment   http://www.wise-forum.org

A3.3 International sites

International Telework Foundation   http://www.teleworkfoundation.org

International FlexiWork Forum   http://www.iff.org

Canadian Telework Association   http://www.ivc.ca

Japanese Telecottage Association   http://egg.tokyoweb.or.jp/soajhome/index-e.htm

Japan Telework Society (J@TS)   http://urban1.ues.rcast.u-tokyo.ac.jp/www/telework/cover.htm

Gil Gordon - telecommuting (USA)   http://www.gilgordon.com/

Jala International, Inc. (USA)   http://www.jala.com

Telecommute America! (USA)   http://www.att.com/telecommute_America

The International Telework Association - ITAC   http://www.telecommute.org/
(Telecommuting Advisory Council, USA)

Telework Resources indicated by Fleming Ltd   http://www.mother.com/~dfleming/dmflinks.htm

Annex 4: Definitions and glossary

A4.1 Definitions

Telework

There are many definitions of telework. This causes difficulties when trying to compare the results of different telework surveys and research. The common element across all aspects of telework is

"the use of computers and telecommunications to

change the accepted geography of work."

It origins can be traced to the introduction of the term "telecommuting" by Jack Nilles in the USA in his publication *The telecommunications transportation trade-off* (John Wiley & Sons, 1976), to denote this type of working arrangement. It was popularised by futurist Francis Kinsman in his book *The Telecommuters* (John Wiley & Sons, 1987). The term "telework" has been popularised in Europe through its use by the European Commission, which from the late 1980s and early 1990s has sponsored considerable research in this field, particularly into the use of telework as a means to develop economic activity and create work opportunities in rural areas or places with economic problems. The most commonly encountered terms are explained below.

Teleworker, telecommuter
Generally interpreted to mean someone who works at home all or part of the time, which is a limited view of the concept. Whereas telecommuter can be seen as an expression to of a worker with an arrangement to avoid commuting by working at home, or closer to home, all or part of the time, a teleworker is someone who uses computers and telecommunications in order to overcome constraints in place or time of work, thus becoming more flexible in the location of work.

Flexible Working
An employer-centred concept that encompasses a wide spectrum of new working practices, including flexible working hours as well as flexibility of work location, flexible contracts of employment. It can also mean flexible use of office space, such as 'hot-desking', where a group of people don't have personal desks but share a smaller number of desks, and use whichever one is free.

Telecentres
These are shared office facilities that provides a range of office services, often for employees of several companies, or different departments of the same company. It means that employees can use the office that's most convenient to him or her, rather than specific office space owned by their company or department.

Telecottages
A special class of telecentre, named because of its origins in rural villages. The telecottage movement started in Scandinavia and has now spread to many other parts of Europe, such there are now estimated to be over 500 telecottages across Europe. Telecottages may be converted country cottages, redundant farm buildings or parts of school premises - or they may be conventional office buildings. Telecottages perform multiple roles including offering training in teleworking technology and relevant skills, attracting work that uses these skills and hence being a stimulus to local economic development. They also provide local organisations and businesses access to more expensive office and hi-tech equipment.

Home-based Telework, Home Teleworking
In this mode of telework, the home is the locus of work and the main work location or base of a teleworking employee or self-employed teleworker. Part of the home is an 'office' workplace, with typical office facilities, such as filing cabinet, business phone, fax and a computer, plus of course, a modem or ISDN link into computer networks.

Nomadic (peripatetic) Telework
These teleworkers have no obvious single location where more work takes place than any other. Armed with mobile telephone and/or portable computer, their office is where the nearest phone plug is (or anywhere if they are on battery power and radio communications). Their work is location independent (see LIW below).

Remote Office Telework
A location physically distant from the main office, where one or more workers work. Such work may be individual work e.g. a member of a team who has not relocated to be physically close to the rest of their team, or a whole 'back-office' team. Such workers typically have 'remote access' to computer systems at the main office.

Offshore telework
A term coined by Management Technology Associates during their 1992-1993 Telework Study for the UK Department of Trade & Industry. A variant of the remote office idea where work is split across several countries. Jobs are shifted from one region, town or country to another. Pan-European call handling centres are example of this.

Televillage
This concept is an extension of the telecottage and is very much about lifestyles and preferences. A televillage is a whole community highly geared to the future work and lifestyles. The whole village is 'wired' and each home is fully equipped with an internal network connected to the village network and through broad band communications to the 'global village'. As portable and mobile technology become more pervasive, the wide range of working modes considered as one form of telework or another, start to blur, as does their comparison with 'conventional' work.

Teletrade

Teletrade literally means "doing business over networks". It uses advanced information and communications technologies (such as the Internet) to market and sell goods and services, enhance customer relationships and reach distant markets without the overhead of a local 'physical presence'. Although similar in concept to electronic commerce, the latter most often refers only to the actual trading transaction e.g. the placing of an order. EDI (Electronic Data Interchange) is an example of a technique that exemplifies the narrow view of electronic commerce. Teletrade covers all aspects of the selling cycle and the buyer-seller relationship. It includes making potential customers aware of products and services, such as through the Internet; providing means of ordering and in some case making payment over electronic networks; providing online support and generally enhancing customer relationships via focused two-way communications (e.g. via email or electronic communities) between buyer and seller.

Telecooperation

Telecooperation is the application of information and communications' technologies by individuals and organisations to enhance communications and access to information. People working collaboratively over a networked as part of a virtual team are an example of telecooperation. So is alliance building to create a network of dispersed individuals who come together to cooperate for a shared purpose. When more formal, this network may be considered a virtual organisation (see glossary). Telecooperation entails new skills and changes to organisations. In particular the information and communications flows of traditional organisational hierarchies are undermined, and the barriers of communication across organisation boundaries are dissolved.

A4.2 Glossary of Terms

ACD (Automated Call Distribution). A system where calls to a central telephone number are automatically diverted to a free operator. This person may be a remote or home-based teleworker.

ACTS (Advanced Communications Technologies and Services). A European Union research and technology programme under the Fourth Framework. ACTS is concerned with the deployment and use for economic and social benefit of advanced trans-European networks and services, such as ISDN, mobile communications, broadband and multimedia services. ACTS focus is on applications rather than the technology per se.

ADAPT is an initiative financed by the European Social Fund which aims to assist the workforce adapt to industrial change. Thus, the Information Society and advances in ICTs are looked at from the human resources development perspective, issues which are of direct relevance to telework. The Social Fund is contributing 1.6 BECU over five years and, together with Member State co-funding, this reaches 3.2 BECU

ADSL (Asymmetrical Digital Subscriber Line). A way of providing high bandwidth services into the home, such as television, video on demand and Internet access. It uses conventional twisted pair copper cable.

AET (Asociación Española de Teletrabajo). Spanish Telework Association.

AFTT (Association Française de Teletravail et des Téléactivités) French Telework Association.

ATM (Asynchronous Transfer Mode). A communications standard for combining data, voice and video on high speed data channels. Data is sent in packets of 53 bytes, comprising 48 data bytes and a five byte header. ATM is likely to be the main protocol used on Internet backbone channels in future. Channel speeds of 155, 625 and 2,540 Mbps are being planned by telecommunications operators.

Audioconferencing. A multi-way telephone conference. Several people are connected at the same time by the telephone service provider and can hold virtual meetings. Connection may be initiated by dialling out from the service provider or dialling in at a pre-determined time. Providers offer a range of add-on services such as transcription.

BBS (Bulletin Board System): an on-line service for posting messages, archives of files, and any other services or activities of interest to a specific group of users. BBSs can be both public and private and have traditionally been the domain of hobbyists, but an increasing number are now connected directly to the Internet, and many are also operated by government, educational and research institutions. (See also Newsgroups and Ussenet).

BPR (Business Process Re-engineering). The radical redesign of businesses processes to improve efficiency, quality, reduce cycle times and improve customer service. Telework offers opportunities to reconfigure supply chains, and gain benefits of round-the-clock working. However, the EC supported project COBRA found little exploitation of telework in BPR initiatives.

Broadband. Generally data transmission speeds in excess of 1 Mbps. Contrast modem speeds of 28.8Kbps and an ISDN channel of 64Kbps.

Browser. The software used to display HTML pages on the World Wide Web. Netscape's Navigator and Microsoft's Internet Explorer are the world's most widely used browsers.

BTA. Belgian Telework Association.

Cable modem. A device that interfaces between coaxial cable television/voice channel and home computing equipment. Holds the potential for providing high speed Internet access.

Call Centres. An example of remote office working, where work previously dispersed is centralised into one centre, often located in an area with available labour, lower costs and good telecommunications connections. Calls to local customer service centres are automatically diverted to the centre, which typically covers a large region or continent.

CERN (Centre European Researche Nucléaire). Research centre near Geneva where the WWW was invented.

Communities of Practice (CoP). Informal groups of people who share information and knowledge. A term originally coined in Xerox Parc to describe "peers in the execution of real work", as opposed to formally constituted teams. Examples are CoPs that work virtually in electronic communities (q.v.). CoPs are playing an increasingly important part in knowledge management (q.v.), particularly for tacit knowledge sharing across departmental boundaries.

Community networking: the use of electronic networks to build and enhance communities. These can be both specific geographical communities, as well as communities connecting individuals (or groups, organisations) who have similar interests wherever they are located. (See also virtual communities)

Computer conferencing. A form of groupware where users can send messages to 'bulletin boards' or other information databases and receive replies. The information bases are organised into topics, thus making it easier to connect with people with common interests.

CSCW (Computer Supported Cooperative Work). The software tools and working methods used to support team work, especially virtual teamwork (q.v.). It includes the use of computer conferencing, electronic 'white board' systems and use of Intranets. A more popular, though restricted, term is groupware (q.v.).

CTI (Computer Telephony Integration). The integration of computer systems with telephones. This may be dial-out facilities from a computer, or more typically use of intelligent exchange facilities that brings up caller information and database records on a computer screen when a telephone is answered.

Cyberspace: A term used to describe the imaginative "space" where people communicate electronically using email and other online services, normally over the Internet. The name was originally coined by William Gibson in his science fiction novel *Neuromancer* to describe the "world" of computers, and the society that gathers around them.

DECT (Digital European Cordless Telephone). As its name implies, this is a standard for cordless phones. The most likely scenario is around a building though there are some services that operate in public places.

Desk Top Conferencing (DTC). Videoconferencing where communications is from computer-to-computer, rather than remote video camera to local monitor. The users have a small video camera mounted on top of their computer monitor. Software integrates video images into the Windows desk-top environment. This means that participants can see images of each other alongside other computer generate information such as documents. Telecooperation takes place by a combination of visual conversation and collaborative document sharing.

Digital economy: characterisation of the new global economy dominated by digital infrastructures, i.e. electronic or digital networks based upon ICT infrastructures and especially the Internet. (See also network economy).

Digitalisation: the process of conversion away from traditional analogue telecommunications technology, based upon the continuous variation of the strength of a signal, to new digital telecommunications technology, where the signal is represented only by its presence (ones) or absence (zeros) as *bits*. Digitalisation enables telecommunications systems, like telephones, to converge and interact directly with digital computers and other information technology hardware and software. From 1998, digital television services are starting to be introduced in Europe, which means that the broadcast media can also become converged with telecommunications and computers.

Ecash (Electronic cash). Cash that exists as information. It may be held in smart cards or on disk storage and can be traded through special terminals or over networks. At the moment several commercial variants are appearing e.g. Digicash, Mondex.

ECTF. European Community Telework/Telematics Forum.

EDI (Electronic Data Interexchange): the exchange of structured electronic messages (such as orders or invoices) over special telecommunications networks to replace paper transactions.

EFT (Electronic Funds Transfer): Authorising and making financial payments over special telecommunications networks.

EITO European Information Technology Observatory.

Electronic Commerce (E-Commerce). The handling of formal transactions over electronic networks, often directly computer to computer. Early electronic commerce took place over proprietary networks using EDI (Electronic Data

Interchange), but the scope is now considerably wider including trading over open networks such as the Internet (see Internet Commerce). Similar to, but narrower in scope than teletrade (see definition above). Many aspects of electronic commerce are now attracting 'E' labels e.g. E-payments, E-shopping, E-banking.

Electronic Communities. Usually refers to a Virtual Community (q.v.) in the electronic commerce or electronic market context.

Electronic Markets. Locations on the Internet, which facilitate connections and trading between buyers and sellers. These may be in the form of virtual shopping malls, trade directories, electronic communities or online auctions.

Email. Electronic mail. Sending and receiving messages over computer networks, such as the Internet.

ERDF (European Regional Development Funds). One of the four Structural Funds of the European Union.

ESF (European Social Funds). One of the four Structural Funds of the European Union.

ESPRIT (European Special Programme for Research into Information Technology). A European Union research and technology programme under the Fourth Framework. Its focus is on the collaborative development of core technologies such as complex semiconductors, multimedia and expert systems.

ETD (European Telework Development). An initiative under the ACTS programme. The aim of the initiative is stimulate the beneficial uptake of telework, teletrade and telecooperation.

ETO (European Telework *Online). The Web site on European telework (http://www.eto.org.uk), supported in part by ETD. For details see Annex 3.

ETW (European Telework Week). A coordinated week of activities, such as conferences, exhibitions and open-house events to focus public and media attention on the economic and social benefits of telework. The first European Telework Week was held from 9-16 November 1995, and has been followed by others, growing more diverse and widespread annually. European Telework Week 1998 runs from 2-9 November 1998.

Extranet. A network using Internet protocol, that allows external organisations, such as suppliers or customers, access to selected internal information. In essence, it is an Intranet (q.v.) which gives external users restricted access (for example using password protection) to particular information through the firewall.

FAQs (Frequently Asked Questions). Files of answers to questions commonly asked by those joining an online service such as an email distribution list, a computer conference or Internet newsgroup. The ETO Web site has a series of frequently asked questions including questions of interest to teleworkers seeking employment, researchers into telework and of those balancing work and domestic commitments. See Web page http://www.eto.org.uk/faq/faqintro.htm.

Fast company: a US term for an organisation which balances between the extremes represented by *free agents* and the traditional career path. As the name implies, a fast company, tends to be rapidly constructed and rapidly transformed or dismantled as need or wishes direct, but it still provides a greater sense of belonging and continuity than *free agency*. A fast company is a stable, if temporary, organisation where mutual commitment can build relationships and social glue, in which finding good people to work with and for, without the traditional "them" and "us" of employer-employee relationships, becomes the biggest challenge.

Firewall. A secure gateway limiting access in and out of an internal computer network, such an Intranet. A combination of settings on communications hardware, and software on computer servers, denies access to unauthorised users.

Free agent: a US term for an individual similar to the traditional free-lance worker but extended over a much wider geographical range and a greater number of interlocking markets because of new networking capabilities. A free agent has total flexibility in, and often total control over, how, where and when they work, and are very much the "stars" of

the labour force who can pick and choose work from a great number of potential clients. Possessing unique or highly sought after skills, free agents are individuals who shun traditional corporate career paths and the worker-boss relationship, substituting instead the *hard fun* of activities they wish to engage in and thus into which they are prepared to invest a lot of effort and expect to retain much of the benefit.

ftp (File Transfer Protocol) The process for transferring binary files (e.g. documents or software) across a network.

GAT (General Access Telework). The telework 'chain' of the ACTS programme. GAT brings together those working on specific projects that involve telework (see Annexe 2 for a list of these projects).

Groupware. A class of computer software that allows several users to collaborate through sharing information. Computer conferencing and group decision support systems are types of groupware. Lotus Notes is the most widely used groupware product.

GSM (Groupe Special Mobile). A European standard for cellular phone digital communications. Allows mobile phones to be used in countries across Europe and certain other parts of the world (over 70 in total). The main alternative digital standard is PCN. This is used by some European operators (e.g. Orange in the UK), but is more widely found in the Far east and Northern America. An emerging standard UMTS (q.v.) should hopefully overcome the current incompatibilities.

GIF (Graphics Interchange Format). Compression algorithm for computer images in 256 colours. Two variants GIF87 and GIF89. The mostly used format for images on the Internet, although JPEG (q.v.) compression is considered better for high quality photographs and usually compresses smaller.

HTML (HyperText Mark Up Language). The code used on WWW pages to instruct the browser how to display the text. It add different types of tags and pairs of tags to delineate blocks of text. For example, the pair <H1> </H1> around a block of text indicates a first level heading, <B> </B> indicates bold text, and <P> is a paragraph tag. HTML is evolving rapidly. Version 3 is currently the existing standard, but HTML extensions (e.g. new tags) and new standards (e.g. XML) are being developed all the time and used in particular packages, which means that users must keep upgrading browsers or using different browsers to read all such text.

http (Hypertext Transfer Protocol). The protocol used to transfer information across the World Wide Web. It indicates that the information is encoded in HTML (q.v.) See also URL.

IAP (Internet Access Provider). A supplier of connections to the Internet. Such connections may be dial-up (where the Internet is accesses through a modem), ISDN (q.v.) or leased line.

ICT (Information and Communications Technology). A generic term that covers both information technology (computer hardware and software) and telecommunications equipment and services. Its increasing use indicates the growing convergence between these strands of technology.

Information Society. The term adopted the European Commission to indicate a society where information is a key component of economic and social activity. Citizens, both consumers or workers, use information intensively. It is universally accessible through advanced information and communications technologies.

Intelligent Agent. A piece of software using artificial intelligence techniques that operates autonomously using a set of rules. A common type of agent is one that roams the Internet and searches out information. Other types filter incoming information and messages for items of relevance to particular users.

Internet. A network of computer networks, estimated to be around 10 million world-wide. Any computer can join the Internet and exchange information, provided it makes an appropriate physical connection and operates the TCP/IP protocol (q.v.). See also Intranet and Extranet.

Intranet. An internal Internet. In other words an internal computer network that runs the Internet Protocol (TCP/IP). Most Intranets have a computer 'gateway' to the wider (external) Internet and deploy a 'firewall' (q.v.) to prevent unauthorised access to a company's information.

IPR (Intellectual Property Rights): Rights to intellectual material normally in the form of content on electronic networks where it can be difficult to control copying and use without the IPR holder's knowledge and/or permission.

ISDN (Integrated Services Digital Network). Services that allow sharing of multiple devices on a single line, e.g. telephone, fax and computer access to online services. Basic rate ISDN service (ISDN-2) consists of two 64kbps digital communications channels, while primary consists of 32. Although ISDN offers significant benefits for certain kinds of telework, their costs and ease-of-use have deterred many home workers when contrasted with high speed modems.

ISP (Internet Service Provider). A supplier of Internet services including access. Originally distinguished from IAPs (Internet Access Provider q.v.) since they provided the major back-bone connections between countries, and sold on bandwidth to smaller local IAPs. The term seems to be declining in use.

ISPO (Information Society Project Office). A service unit established by DGIII and DGXIII to act as a bridge builder between Commission Services and external counterparts active in Information Society issues, including technological, social, economic, etc. ISPO is part of the Information Society Activity Centre (ISAC) whose role is to raise awareness of the opportunities and impacts of Information Society development by arranging special events, providing a leadership role in running conferences, participating in other relevant conferences, workshops, seminars, etc., and in participating in selected projects

IST (Information Society Technologies) Programme: **a** European Union research and technology programme under the Fifth Framework (1999-2002). The IST Programme is based around four Key Actions, including Key Action II on *New Methods of Work and Electronic Commerce*, as well as a number of cross programme activities and accompanying measures.

IT (Information Technology). Strictly speaking is only computer hardware and software not including telecommunications equipment and services (cf. ICT), but is often used synonymously with ICT to mean both these types of technology especially as they are now substantially converged.

JPEG (Joint Photographic Experts Group). An image format for compressed photographic images. It gives good results at compression ratios of up to 20:1. This efficiency means it is widely used on the Internet. See also GIF and MPEG.

Kiosk. A customised access unit, providing consumers simplified access to a range of information services. A typical kiosk is found in a public area, such as a shopping centre or railway station, and is robustly constructed. It is a metre or so high and operated by people standing up. Although powered by computer, its interface is not usually a computer keyboard, but is typically a touch screen display or a standard display with a customised set of interface buttons.

Knowledge Management. The management of an organisation's knowledge, both explicit (information or knowledge that can be codified) and tacit (the knowledge in people's heads). It involves a systematic approach to managing knowledge processes - creation, identification, gathering, classifying, storing, disseminating and using - as well as creating the environment for knowledge creation and sharing to flourish. Collaborative technologies, such as the Internet, Intranets and groupware play an important part in most knowledge management initiatives.

Knowledge Networking. The creation and development of knowledge through person-to-person networking, often augmented by online communications. Knowledge networking takes place in communities of practice (q.v.), electronic communities (q.v.) and various forms of virtual organisation (q.v.).

LAN (Local Area Network). A network that connects computer together within a small area, usually a single office. Facilities such as printers and disks can be shared. Many LANs have gateways to connect their users to external services such as the Internet.

List Server. A server that redistributes electronic mail to those that have "subscribed" to the list. Commonly used software for list servers are listserv or MajorDomo.

LIW (Location Independent Work). A generic term for flexible work and telework that indicates that the physical location of where the work takes place in unimportant. Modern communications and computer technology bring the work to the worker, wherever they happen to be.

MIME (Multipurpose Internet Mail Extensions). A standard format for encoding files for sending over the Internet. It is able to handle special character codes and symbols, which the Internet, which can only handle 7-bit ASCII codes is unable to do. Thus it can be used to send files as varied as word processing documents, spread sheets, image and video files. Such files 'attached' to an email are typically MIME encoded, often automatically and transparently to the user. BASE64 is a specific MIME format.

Modem (modulator-demodulator). A device that connects your computer to the telephone network to access remote computers and online services. Modern modems work to standards such as V32. Most can send and receive fax, while later models also handle including voice messages.

MPEG (Moving Picture Expert Group). A group that defines compression standards for video (moving) images, notably MPEG-2. A new standard, MPEG-4, defines images in terms of objects and their attributes, making it easier to manipulate audio-visual objects remotely over networks.

NACT - National Advisory Council on Teleworking - National Council established by the Irish Government to advise it on the development of teleworking employment opportunities in Ireland and to recommend attainable actions which will contribute to the realisation of those opportunities.

NC (Network Computer). A computer that relies on a computer network for its ongoing operation and software, which is downloaded as required. By restricting its range of application it can be made simpler and cheaper than a fully configured personal computer. Common formats are hand-held devices and slim-line table-top devices with no local hard disk storage.

Network economy: characterisation of the new global economy dominated by networks, i.e. multifarious nodes and connections in contrast to hierarchical and otherwise controlled economies. Normally means the electronic or digital network based upon ICT infrastructures and especially the Internet. (See also digital economy).

Newsgroups. Bulletin boards, where users post messages that can be accessed by others using a "news reader". Each newsgroup focuses on a specific topic, often of very narrow interest. Each newsgroups has its own unique address, such as uk.business.telework. These are organised into hierarchies, where the prefix indicates types of newsgroup (e.g. biz. (Business), sci (science) rec. (Recreation) etc.) or country using the Internet two character codes (e.g. uk, de, es). See also USENET.

NTF (Nederlands Telewerk Forum). The national teleworking association in The Netherlands.

OEN (Open Electronic Networking). The use of open systems like the Internet, for telecooperation. This contrasts with proprietary online services (q.v.). OEN uses a variety of methods including electronic mail, distribution lists and the World Wide Web.

OLR (Off-Line Reader). Software that allows users of email and the Internet, to download new information into their local computer and browse it while not connected. This saves significantly on telephone charges. A built in feature of many email systems (e.g. Eudora), but some specialist packages (e.g. Virtual Access) provide similar interfaces for multiple services.

Online Services. Services that dial-up users access for electronic mail and a range of information services. Some are restricted to information access, such as Lexis-Nexis, while the more general services such as CompuServe and AOL, also offer email, computer conference and WWW access. At one time many of these services used proprietary software and did not allow Internet access. The dividing line between these and Internet services is blurring.

PGP (Pretty Good Privacy). A method of encrypting messages, such that they can only be read if the recipient applies the appropriate decryption method. Encryption and decryption relies on a combination of private 'key', known only to the sender and a 'public' key, known to the recipient. Since messages are encoded using cryptographic algorithms they are extremely difficult to decode if intercepted. Encryption is at the heart of secure electronic transactions (see SET). PGP was developed privately to overcome restrictions placed by US legislation on the export of encryption technology.

PoP (Point of Presence). Used to indicate an access point to an Internet Access Provider (q.v.). Many providers now provide PoPs on a national or international basis, through agreements with other IAPs or ISPs. This gives their clients Internet access for the cost of a local telephone call from many locations, a boost to reducing the cost of location independent working (see LIW).

PSTN (Public Switched Telephone Network): the ordinary standard telephone network.

Push Technology. A way of pushing information to an Internet user in background mode. While the user is browsing or accessing email, 'channels' of information (according to user selection) are pushed into their local computer invisibly. They may be viewed later by user selection, or activated as a screen saver. Pointcast, for example, scrolls ticker tape style stock prices, and shows panels of information (including news headlines, company and industry news, and weather forecasts) when the users' computer is otherwise idle.

Remote Access. Software that allows a computer user to access any application on a remote computer. This contrast with specific applications, such as email, where the client software is already held in the local computer. Variants include remote node and remote control. Remote node gives access to a remote network, and you are just another user running application. Remote control means you actually take control of the remote PC through your local keyboard. The remote PC runs the application and its display image is mirrored back to your local computer.

RISI (Regional Information Society Initiatives), part of the Article 10 of the Structural Funds.

Search Engine. A facility that lets you search for information on the Internet from an index, that typically holds references to all the text on WWW pages. The indexes may relate to the content on one site (e.g. a version of Excite indexes the ETO Web pages daily) or hold references to WWW pages all over the Internet (50 million plus). Commonly used engines are Lycos, InfoSeek, AltaVista, and Excite. Selection of pages to index may be manual (a creator submits pages for indexing) or automatic, where a 'crawler' or 'spider' (intelligent agents q.v.) roams the net to find new and pages.

SET (Secure Electronic Transactions). A protocol standard which uses key encryption for transmitting information as part of a teletrade transaction. It may be used to authenticate buyers and transfer funds. The standard is backed by major finance clearing organisations (VISA and Mastercard) and will increasingly be incorporated into commercial electronic commerce servers and client (browser) software. An important aspect of the practical use of such as standard is that of 'trusted third parties' who hold the private parts of the keys of buyer and sellers. See also PGP.

SIT (Societa Italiana Telelavoro). A national society for teleworking in Italy.

Social Partners. Organised representatives of labour market interests such as employers associations' and trades unions.

SOHO (Small Office Home Office). Defined by marketers as a segment of buyers with common characteristics. This is a small office, that may be part of a person's home. The amount and size of equipment used is generally lower than that in large offices, and users more cost sensitive.

SME (Small to Medium Enterprise). In European Union terms this is defined as an enterprise which has less than 250 employees, is less than 25 per cent owned by large companies, and has a total turnover of less than 40 MECU or annual balance sheet of less than 27 MECU. This definition dates from 1996, and replaces and earlier definition that

included enterprises less than 500 employees. It includes medium, small (less than 50 employees) and micro-enterprises (less than 10 employees).

Spamming. The frowned upon practice of posting messages indiscriminately into newsgroups and individual emails e.g. for unsolicited advertising.

TAP (Telematic Applications Programme). A European Union research and technology programme under the Fourth Framework. Its focus is the application of information and communications technologies in areas such as education, health, transport and libraries.

TCA (TeleCottage Association). The biggest telework association in the UK. Although its roots are in the telecottage movement its full title is The Telework, Telecottage and Telecentre Association.

Teleactivity. A generic term, not widely used, to include all types of teleactivity that are part of telework, teletrade or telecooperation. Examples of teleactivities are teleshopping, telebanking, telemedicine etc.

Telecommuting. See Definitions (above)

Telecooperation. See Definitions (above)

Teleconferencing. A generic term that includes both video- and audio- conferencing (q.v.).

Telecottage. See Definitions (above)
Telecentre. See Definitions (above)
Teletrade. See Definitions (above).

TTS (Transport-Telecommunications Substitution). The substitution of telecommunications based methods such as telework and teletrade to replace physical travel or transport. Telecommuting to replace physical commuting is one example of the former, while document delivery over a network, instead of using a courier is an example of the latter.

TQM (Total Quality Management). A systematic approach to inject quality thinking throughout an organisation. While the ultimate focus is on quality of products and services, the essential ingredients are conformance to a set of standards, such as those embodied in ISO9000 and ISO9001.

TWI - Telework Ireland, the Professional Association of Teleworkers in Ireland

UMTS (Universal Mobile Telecommunications System). An emerging cellular standard that supports speeds up to 2 Mbps, and designed as a successor to GSM. Its name is slightly misleading in that one of its aims to provide seamless services to users across both fixed and mobile networks.

URL (Uniform Resource Locator). It defines an Internet location and type of resource e.g. ftp://ftp.myfiles.co.uk is an ftp server and http://www.myco.co.uk/pages.html is a reference to an html page

USENET. Also known as Net News. A large distributed bulletin board system consisting of over 12,000 newsgroups. Each newsgroup is propagated around the Internet on a daily (or more frequent) basis. Internet Access Providers hold copies of a large proportion of these for local access by their users.

UUencode. An encoding format that translates files into 7-bit format for transmission over the Internet. An earlier alternative to MIME encoding (q.v.).

Videoconferencing. The use of camera (with microphone) and monitor to allow visual communications over a high-speed communications link (typically 1Mbps or higher) instead of proximity face-to-face communications. Videoconferencing equipment ranges in size from person-to-person, to large group. Users can control camera direction and angle of vision, so that remote users may be shown images other than the user's face. Person-to-person communications is increasingly being incorporated as another channel in computer communications (see Desktop

Conferencing), while use of compression techniques means reasonable quality video over much slower links than traditionally (e.g. 128kbs ISDN).

Virtual Organisation. An organisation of various independent members that operates cooperatively (and may have been created) without the constraints of space and/or time. Telecooperation (q.v.) is its main *modus operandi*. ETD (q.v.) is an example of a virtual organisation. It is a consortium of business partners and individuals who work as a coherent organisation on the ETD initiative.

Virtual Communities. Communities that have been developed around an area of common interest, and use online techniques to sustain themselves. They may use electronic bulletin boards (forums), the World Wide Web or email distribution lists to share information and maintain communications. As well as volunteer run communities, others are being developed by commercial ventures, to create a focal point for electronic marketing (see Electronic Communities).

Virtual Corporation. The more commonly used American term for a virtual organisation.

Virtual Teams, Virtual Teaming. The concepts of virtual working applied to a work team. Members of the team work at different locations and use telecooperation methods to progress their joint work.

Virtualisation. A blanket or umbrella term used to embrace the many types of virtual activity or structure, where traditional forms are replaced by those taking place remotely over networks. Telework, for example, is the virtualisation of work, while teletrade is the virtualisation of products and services. Virtual teams (q.v.) and virtual organisations (q.v.) are other specific examples of virtualisation.

Voice mail: the recording, storage and retrieval of voice messages.

Webcasting. Broadcasting live video and audio data over the Internet. For example, speeches and talking heads from conferences can be received by Internet users over the ordinary telephone network in real time. Speakers' overheads can also be made available, and facilities for receiving Internet users' real time feedback (by telephone, fax or email) can be provided. After the conference, the event archive can be stored for subsequent downloading and replaying.

WWW (World Wide Web). The collection of HTML pages that reside on Web servers across the world. It is estimated that there are over 100 million publicly accessible WWW pages on the Internet, a number that has been more than doubling every year.

Annex 5: Recent publications and references

A5.1 Publications of the European Commission

Title	Author	Other Details	Date
Report on the European Telework Information Day, 1 June 1999	Ed. Jeremy Millard	CEC, DG XIII/C/1 New Methods of Work*	June 1999
Status Report on European Telework – Telework 1998	European Commission (DGXIII-B)*	CEC, DGXIII/C/1 New Methods of Work*	September, 1998
Deployment of Telework in European Public Administrations Rapid Assessment	Fritz Betz, Johanna Riegler and Irene Schwarz Centre for Social Innovation, Vienna	European Founda-tion for the Improve-ment of Living and Working Conditions, and DG V	30 April, 1998
1998 Report of the Information Society Forum	The Information Society Forum	Information Society Forum Secretariat BU 24 2/70 Rue de la Loi B-1049 Brussels	January 1998
Report on the European Telework Information Day, 28 May 1998	Jeremy Millard	Available from CEC, DG XIII/C/1	August 1998
Status Report on European Telework - Telework 1997	European Commission (DGXIII-B)	Available from CEC, DG XIII/C/1	October 1997
Communication on The Social and Labour Market Dimension of the Information Society: People First - The Next Steps	European Commission (Communication)	COM(97)390	July 1997
Telework in Europe: Bridging the Gap between Social and Societal Needs and New Technology Opportunities: Seminar Report	Jeremy Millard	Available from CEC, DG XIII/C/1	June 1997
Partnership for a New Organisation of Work	European Commission (Green Paper)	COM(97)128	April 1997
Proposal for a European Parliament and Council Decision Concerning the 5th Framework Programme of the European Community for Research, Technological Development and Demonstration Activities (1998-2002)	European Commission (Proposal to Council and Parliament)	COM(97)142	April 1997
Europe at the Forefront of the Global Information Society: Rolling Action Plan	European Commission (Communication)	COM(96)607	Nov. 1996
The Information Society and the Citizen: A Status Report on the Availability and use of Information and Communications Systems.		ISPO BU24 2/78 Rue de la Loi 200 B-1049 Brussels	Sept. 1996
Living and Working in the Information Society: People First	European Commission (Green Paper)	COM (96) 389 Published as	July 1996

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* The gravity of telework activities, which was in DG XIII Directorate B (ACTS) under the 4th Framework Programme of European RTD is now in the new Unit C/1 New Methods of Work, following the reorganisation that took place in order to adapt DGXIII to manage the new Information Society Technologies programme, part of the 5th Framework for European RTD (1999-2002).

		supplement 3/96 to the Bulletin of the European Union. ISBN: 92-827-7869-X Price: ECU 7.	
Networks for People and their Communities	The Information Society Forum	Information Society Forum Secretariat BU 24 2/70 Rue de la Loi B-1049 Brussels	June 1996
The Social Implications of Teleworking: Abstracts	European Foundation for the Improvement of Living and Working Conditions	European Foundation Loughlinstown, Dublin 18; E-mail: postmaster@eurofound .ie	May 1996
Building the European Information Society for Us All: Interim Report.	High Level Experts group on the Social and Societal Aspects of the Information Society,	Available from CEC, DG V/B/5 Rue de la Loi 200 B-1049, Brussels	Jan. 1996
The Citizen's Network: Fulfilling the potential of public passenger transport in Europe - Green Paper	European Commission	ISBN 92-827-5812-5	1996
Building The European Information Society For Us All: Interim Report	High Level Group Of Experts		1996
Actions for stimulation of transborder telework and research cooperation in Europe - TELEWORK 96	EC - DG XIII C1	ISBN-94-96-695	1996
Electronic Commerce Workshop (Brussels 22-23 April 1996)		Report on workshop.	1996
Telework Congress, Chance and Challenge for Europe, Luxembourg (26-28 June 1996)	Various.	Conference proceedings. ISBN 92-827-8640-4 Price: ECU 22	1996
The Way Forward: Advanced Communications, Economic growth and Social Development in Europe.	Project FAIR (ACTS)	ISBN 0-903622 77 7 Available from: DG XIII-C1 Ave de Beaulieu 9, 2/27 B-1160 Brussels Email:adb@postman.d g13.cec.be	1996

Publications obtainable from the Office for Official Publications for the European Communities, L-2985, Luxembourg.

A5.2 Other publications[76]

Title	Author (s)	Publisher/Other Details	Date
Teleworking and Globalisation	Ursula Huws, Nick Jagger, Siobhan O'Regan	IES Report 358, Grantham Book Services Ltd, Isaac Newton Way, Alma Park	July 1999

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[76] See book section on http://www.eto.org.uk/resource, and http://www.telecommute.org/twbooks.htm

		Industrial Estate, Grantham NG31 9SD, UK. Tel. +44 1476 541080, Fax +44 1476 541061	
Telework, Telecentres and Teledidactic (Telelavoro, Telecentri, Teledidattica)	P. Di Nicola & F. Buzzoni (eds)	IFOA and ETD	May 1999
European Information Technology Observatory 99 (EITO'99)	EITO Task Force	EITO, Lyoner Str. 18, D-60528 Frankfurt/Main. Can be ordered from ETD http://www.eto.org.uk/eito/	March 1999
Zicht op telewerken	H .de Vries, T.Weijers	Minsterie van Sociale, Zaken en Werkgelegenheid Tel 070-3819900 ISBN 90 5749 244 X	1999
The Weightless World - thriving in the digital age	Diane Coyle	Capstone, Oxford, UK ISBN 1-84112-017-0	1999
Local connections – making the net work for neighbourhood renewal	Claire Shearman	Communities Online PO Box 18714 London E6 6GL, UK http://www.communities.org.uk	1999
Teleworking and Local Government: what are the costs and benefits?	Ursula Huws	LGMB david.maycock@lgmb.gov.uk Tel.: + 44 171 296 6756	1999
Télé travail : choisir la bonne voie	I. Mouronval et F. Mercier	Bureau d'é tudes de la CFTC	January 1999
Telework in the Netherlands Labour law, social security law and occupational health and safety aspects.	Hester de Vries	Hugo Sinzheimer Institute, University of Amsterdam, Tel.: +31 20 52535	1998 Novem-ber 1998
Teleworking Environments. Proceedings of the Third International Workshop on Telework	Ed. Reima Suomi, Paul Jackson, Laura Hollmé n, Mats Aspnäs	Turku Centre for Computer Science, General Publication No 8, ISBN 952-12-0253-X	September 1998
Managing Telework: strategies for managing the virtual workforce	Jack M. Nilles	John Wiley & Sons ISBN 0471293164	August 1998
Flexible Werken/Telewerken; het managementinstrument van deze tijd	Mininsterie van Verkeer en Waterstaat	Available from Ministerie van Verkeer en Waterstaat, Directie Voorlichting, Postbus 20901 NL - 2500 EV Den Haag	May 1998
The Home Office Solution: how to balance your professional and personal lives while working at home	Alice Bredin, Kirsten Lagatree Paperback	John Wiley & Sons ISBN 0471192090	May 1998
Telearbeit und berufliche Kompetenzen	J.Carmona-Schneider, M.Döing, U,Schwetje	ISA Consult isa-bo@isa-consult.de	May 1998
Télé travail, té lé activité s : outils de valorisation des territoires	Datar	La Documentation Française ISBN 2-11-004016-5	April 1998
New International Perspectives on Telework: from Telecommuting to the Virtual Organisation	Paul J. Jackson Jos M.M. van der Wielen	Publisher: Routledge, FEEPOST, Andover, Hants SP10 5BR, UK	April 1998

		http://www.routledge.com	
New Workplaces for New Workstyles	Marilyn Zelinsky	McGraw-Hill ISBN 007063324X	Apr.1998
The Ultimate Home Office Survival Guide	Sunny Baker, Kim Baker	Petersons Guides ISBN 0768900077	Apr.1998
Le Guide du Télé travail	P. Vican	Manitoba ISBN 2-251-79017-9	February 1998
Télé travail et Télé services	L. Coope et G. Pannetier	Economica ISBN 2-7178-3563-6	January 1998
Building Action on Ideas: Report of Amsterdam '97 International Workshop	Paul J. Jackson Jos M.M. van der Wielen	WORC Report 97.08.004 ISBN 90-75001-19-9 Work and Organisational research Centre Tilburg University PO Box 90153 5000 LE Tilburg The Netherlands	January 1998
New rules for the new economy – 10 ways the network economy is changing everything	Kevin Kelly	Fourth Estate, London ISBN 1-85702-871-6	1998
The corrosion of character – the personal consequences of work in the new capitalism	Richard Sennett	W.W. Norton & Company, New York and London ISBN 0-393-04678-8	1998
Work and Employment in the Information Society. The W.I.S.E. Report, Vol. 1;	J. Hochgerner / F. Lacina (ed.)	Verlag Guthman Peterson, Wien	1998
Telearbeit - Leitfaden für Klein- und Mittelbetriebe, in: J. Günther (Hrsg.), Band 4 der Schriftenreihe Telekommunikation	F. Edelmann/ G. Staubmann/ H. Tanner	Information und Medien, Donauuniversität Krems	1998
The Teleworking Handbook: New Ways of Working in the Information Society.	Imogen Bertin and Alan Denbigh	TCA - The Telework, Telecottage and Telecentre Association, UK. Tel: +44 1203 696986. Compuserve 1000272,3137@ ISBN: 0 9528492-1-6	Second edition, 1998
Att arbeta på distans – nya arbetsformer i IT-samhället	Walter Paavonen	NUTEK Info nr 049-1998	1998
Distansarbeta i framtidens IT-samhälle	Anita Lundin & Birgitta Persson	Liber Ekonomi 47-042242-7	1998
IT är svaret – men vad var egentligen frågan?	Lennart Forsebäck	IHM Förlag AB ISBN 91 86460 51 X	1998
Telework - Good practice for the future (results from the Telework '97 Assembly in Stockholm)	Walter Paavonen	NUTEK ISSN 1102-2574	1998
Work Transformation		HNB Publishing ISBN 0-9664286-0-9	1998
Telewerk is Maatwerk		Industriebank LIOF, Tel.: +31 43 3280280	1998
Le Guide Pratique du Télé travail	Charbonneau, Dorin, Dumoulin, Gauthier, Lombard, Turbé - Suetens	Les Editions d'Organisation ISBN 9 782708 119789	1998

Prime Esperienze Italiane di Telelavoro - Capire I bisogni e contrattare gli accordi (Second edition)	Renato Rizzo	Mondadori Informatica	1998
The Telecommuters	Francis Kinsman	ASIN 0471917893	1998

A5.3 Telework magazines

Title	*Publisher/Other Details*	*Frequency*
European Journal of Teleworking (English)	Addico Cornix Ltd. 70 Causewayhead, Penzance, Cornwall, TR18 2SR, UK Tel.: +44 1736 332736 Fax: +44 1736 334702	4 per year
Telewerken (Dutch)	(including the N.T.FORUM Newsletter Overkleeft Uitgeverij bv Brinkpoortstraat 38 7411 HS Deventer Tel.: +31.570 611044 E-mail: kene@nedernet.nl	6 per year Price FL 72,50 per year Available by subscription only
Teleworker (English)	The Telecottage Association The Other Cottage Shortwood, Nailsworth Gloucestershire, GL6 0SH Tel.: 0800 616 008	6 per year

A5.4 Telework Associations in Europe

Country	Address	Email/WWW	Tel/Fax
"Europe" ECTF - European Community Telework/Tele-matics Forum	12 Castle Street Totness, Devon UK - TQ9 5NU	protocol@ectf.org.uk http://www. telework-forum.org	Tel: +44.1803.865852 Fax: +44.1803.868377
Austria Austrian Telework Association (Österreichische Telearbeitsvereinigung - ÖTA)	Akademistra. 2/4 A-1010 Vienna	Info@oeta.at http://www.oeta.at	Tel:: +43 1 5852300-23 Fax: +43 1 5852300-11
Belgium Belgian Teleworking Association	c/o Teleport Brussels Buro&Design Centre Esplanade du Heysel B-1020 Brussels	bta@compuserve.com http://www.bta.be	Tel: +32 2 475 2000 Fax: +32 2 475 2010
Finland Finnish Flexiwork Forum (Suomen Joustotyöyhdistys)	Puistotie 27, FIN-04420 Jarvenpaa sjyhal	@kauhajoki.fi http://www.tkk.utu.fi/joustotyo	Fax +358 9 2790 7444
France Asssociation Française du Télétravail et des Téléactivités (AFTT)	6, Rue E. Gaugiran BP 34 41600 Lamotte Beuvron	infos@aftt.net http://www.aftt.net	Tel : +33 2 54 95 61 61 Fax : +33 2 54 88 19 19

Germany Verband Telearbeit Deutschland (VTD)	Balhomer Weg 7 D-34308 Bad Emstal Germany	Si-Reis@t-online.de http://www.vtd.org	Tel.: +49 5624 925383 Fax: +49 5624 925384
Ireland Telework Ireland (TWI)	7 Clones Road Monaghan Ireland	riona@telework.ie http://www.telework.ie	Tel: +353 47 72069 Fax: +353 47 72070
Italy Associazione Lavoro & Tecnologia	P.O. Box 2395, 00100 Rome	lavtec@italymail.com http://www.mclink.it/ telelavoro	Tel.: +39 338 8759486 Fax: +39 6 4391066
Italy Societa'Italiana Telelavoro (SIT)	Via Pierluigi da Palestrina 48 00193 Roma	Sit@isinet.it http://www.societaitalianatelelavoro.it	Tel.: +39 6 3211285 Fax: +39 6 3224256
Luxembourg Association Luxembourgeoise des Télé-Activités (ALTA)	B.P. 50 L-7201 Walferdange	info@alta.lu http://www.alta.lu	Tel.: +352 33 32 32 Fax: +353 33 39 82
Netherlands Nederlands Telework Forum	Vijzelmolenlaan 10 P.O.Box 623 3440 AP Woerden	info@telewerkforum.nl http://www.telewerkforum.nl	Tel: + 31 348.493650 Fax: +31 348.482288
Portugal Associacao Portuguesa para o Desenvolvimento do Teletrabalho	Av. Miguel Bombarda 8 F, Apartado 117, 2780 Oeiras	100135.266@compuserve.com http://www.teleman.pt/apdt	Tel.: +351 1 4416965 Fax: +351 1 4415767
Portugal Associacao Portuguesa de Teletrabalho	Av. D. Nuno Alvares Pereira 27 2735 Cacem	telework@automail.pt http://www.teletrabalho.com http://www.automail.pt/telework	Tel.: +351 1 913 85 03 Fax: +351 1 913 70 99
Spain Associación Española de Teletrabajo	Las Calas 3 28016 Madrid	mickx@ciberteca.es mistrala500@wotwe.es http://www.ciberteca.es/aet.htm	Tel: 341-5153707 Fax: 4137950
Sweden Swedish Networker Association	Box 28 S-920 75 Ammarnäs	enter-by.net@enter-by.net http://www.enter-by.net	Tel: +46 952 602 72 Fax: +46 952 601 65
United Kingdom TCA - Telework, Telecottage and Telecentre Association	Freepost CV2312 WREN Warwickshire CV9 2RR	http://www.tca.org.uk	Tel: +44 1203 696986 Fax: +44 1203 696538